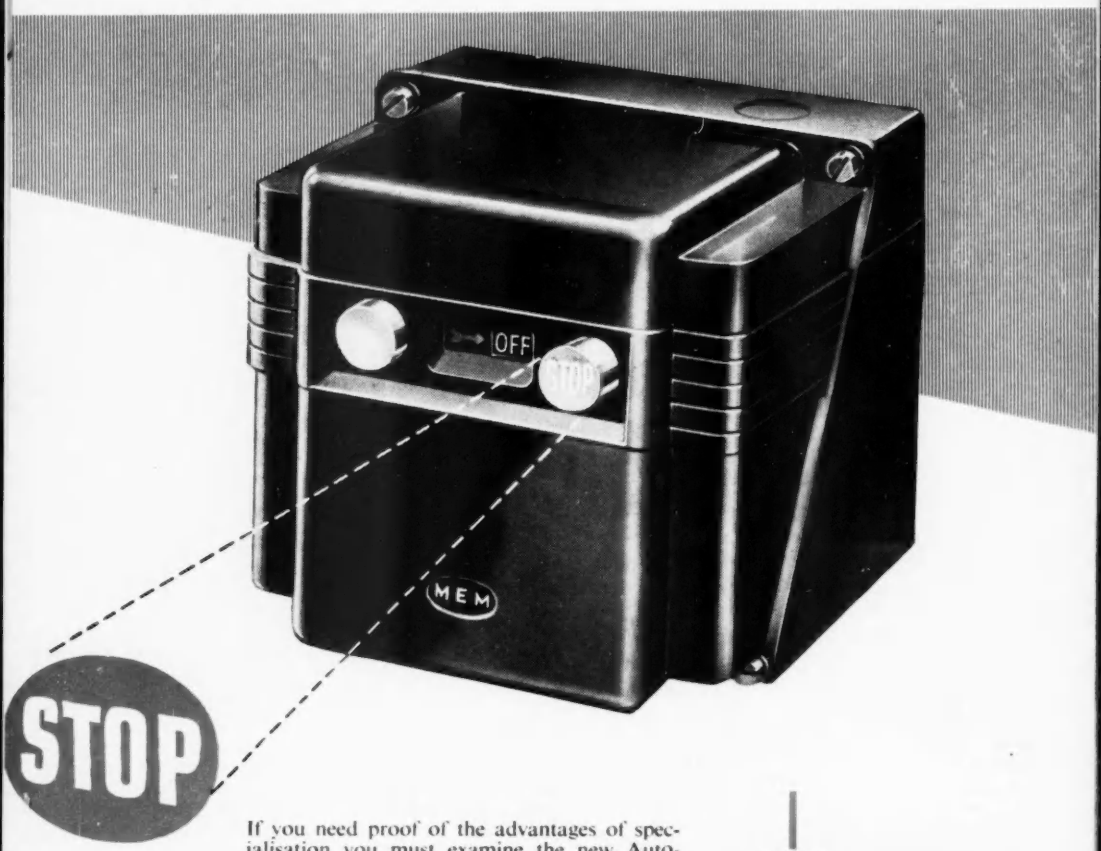
ELECTRICAL TIMES

THURSDAY
18 JAN.
1951
SIXPENCE



STOP

If you need proof of the advantages of specialisation you must examine the new Auto-Memota starters. They embody the results of more than 40 years of design specialisation, and are made in the most self-contained low tension switchgear factory in the world. When you see the advanced design and fine finish we think you will agree that they say the last word in motor starting and protective equipment.

You can get "Auto-Memotas" now without waiting.

MEM

Switch, fuse and motor control gear, electric fires and localised lighting equipment

MIDLAND ELECTRIC MANUFACTURING CO. LTD., BIRMINGHAM 11

Branches in London and Manchester

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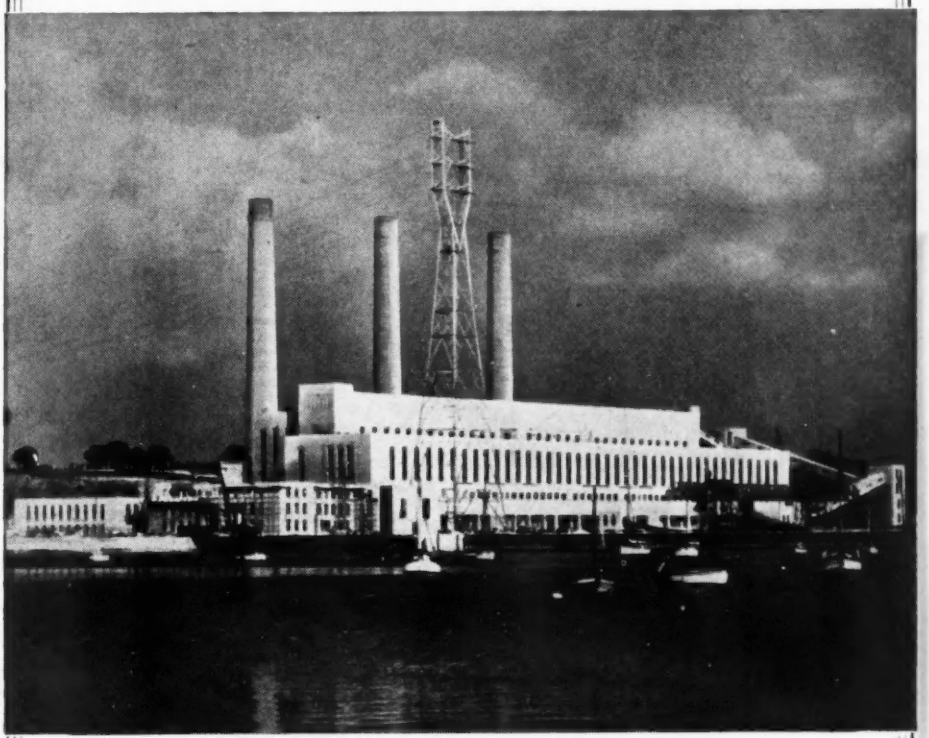
MADE BY THE HOUSE OF Simplex

Simplex Electric Company Limited Oldbury Birmingham & Branches A COMPANY

WAKEFIELD OIL FOR INDUSTRY



All the turbines and ancillary equipment of the British Electricity Authority's new Cliff Quay Power Station are lubricated with Wakefield Industrial Oils.

Cliff Quay Power Station is lubricated with

C. C. WAKEFIELD AND COMPANY LIMITED · LONDON · W.1

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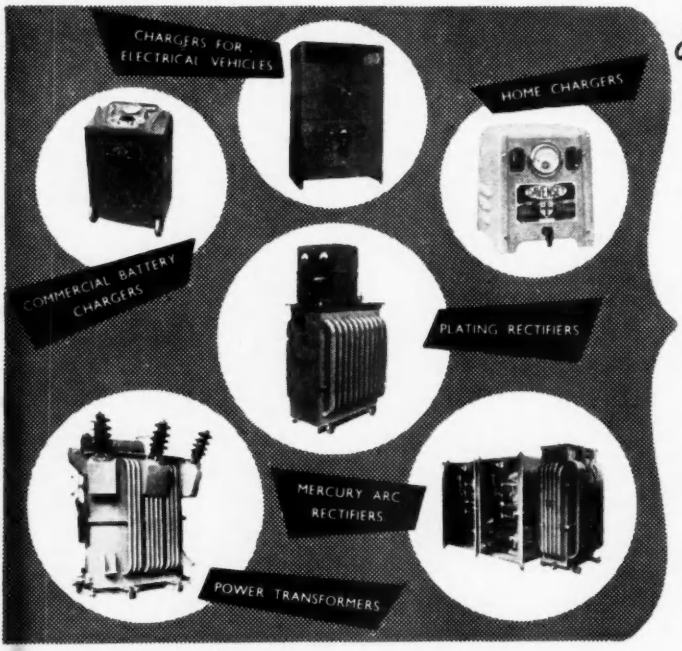

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The Davenset Range of Electrical Equipment is designed for the needs of industry. It consists of Power Transformers up to 500 kVA, Mercury Arc and Selenium Rectifiers for Battery Charging, plating, precipitation, etc.

We specialise in the design and construction of all types of Electrical Equipment built to suit our customers individual requirements.

Please send now for free copies of Booklets Nos. 207, 214 and 217.

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INDUSTRIAL ELECTRICAL EQUIPMENT

Built from the First to Last

PARTRIDGE WILSON & CO. LTD
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SINGLE POLE AND NEUTRAL GEAR

by

SANDERS
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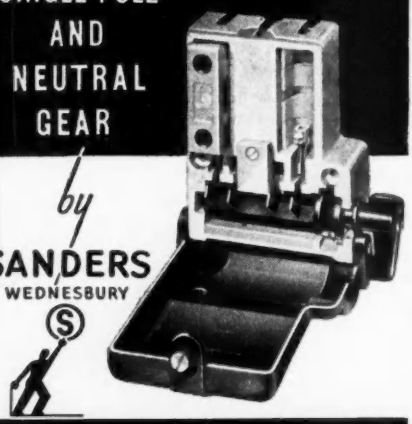

ALL-INSULATED SWITCH FUSE WITH 15 AMP. FUSE
LIST NO. N.101G.
CONSOLIDATED LIST PRICE : 9/1 EACH

ASBESTOS WOVEN WIRE RESISTANCE NETS

COST SO LITTLE & HELP SO MUCH

Write or telephone today for full details, and technical advice if required.

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registered Trade Name of
The Cressall Manufacturing Co. Ltd.
Tower Street, Birmingham 19.
Telephone: ASTon Cross 2666 (3 lines).
Telegrams: "OHMIC," Birmingham.

GENTS' products in WESTMINSTER

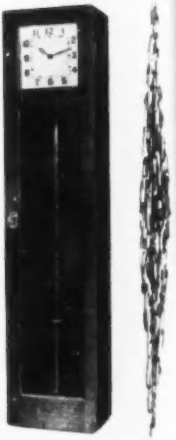
Clocks in the

NEW HOUSE OF COMMONS

This installation comprises 172 Slave Dials with silent movements (similar to those supplied to the B.B.C.) controlled by a Master Clock.

Gothic Style dials and hands of fretted bronze to the design of Sir Giles Gilbert Scott, O.M., R.A., indicate accurate uniform time in all parts of the House regardless of mains fluctuations or power cuts.

Write for a copy of Book 5, Section 1, which gives full details of:



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CONTROLLED ELECTRIC CLOCK SYSTEM

GENT & CO., LTD., FARADAY WORKS, LEICESTER

London Office : 47, Victoria St., S.W.1. Newcastle : Tangent House, Leazes Park Road

Fire & Burglar alarms · Bells · Indicators · Staff Locators · Watchman's Clocks · Telephones · etc.

1912-1951

The Story of BELLING *& Company Ltd.* No. 22

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Director and Sales Manager

C. R. Belling, M.I.E.E., *Governing Director*

D. M. M. Brunton
Director and Research Manager

H. P. Aston, A.C.A.
Director and Accountant

A. B. Withart
Director and General Manager

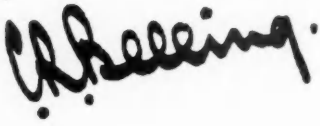
H. M. Hibberd
Director and Works Manager

YOU will probably remember in Chapter 20 I mentioned the five Senior members of my Staff. Here are their photographs and details of their positions with Belling & Co. Ltd. You will see my own picture in the centre and this is a photograph of an oil painting which they have presented me with to mark this particular occasion. As it turns out, however, I gather all the foremen and many of the other employees wanted to join in with the idea when they heard of it, so that the eventual result has been that practically everybody here has now subscribed.

As our employees know, I was never one for presents and presentations and this is only the second time I have agreed to accept one, the previous occasion being at our 25 years jubilee. However, I can assure them that whenever I do accept anything of this kind, it is all the more fully appreciated, and this painting will certainly form a very fitting centre-piece for our new Board Room, which is now being completed. All being well, there will be another chapter of this History in April, 1952, when I shall look forward to telling you the results of our efforts between now and that particular date, which will cover our normal financial year. We are all going to do our utmost. We hope for peace, but we will work equally hard for munitions if this unfortunately becomes necessary.

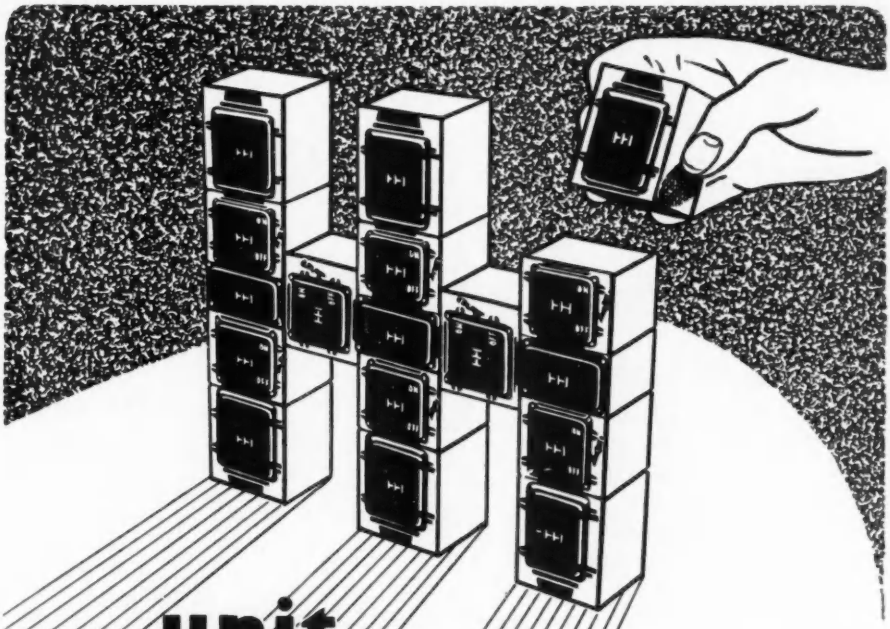
This, therefore, will be the end of the History of Belling & Co. Ltd., for the time being. I feel sure it will have been of interest to many of the older members of the Industry, whom I have known personally for such a long time; and I hope also it may have been of some interest to the younger members as well.

Whilst during the run of this series I have dwelt several times on the efforts of our own staff and employees generally, I realise, of course, only too well that this business could never have reached its present size without the wonderful goodwill which has been shown to us by our many customers, the Supply Authorities, the Wholesalers and the Retailers throughout this Country, and, of course, also our Agents abroad, who have done so much for us in recent years.



Belling & Co. Ltd., Bridge Works, Enfield, Middx. Tel. Howard 1212

CRC22



unit construction

UNIT-TYPE
METALCLAD
DISTRIBUTION-GEAR
Simple to erect and extend

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GOOD NEWS!

TEMCO *the Perfect*
IRON CONNECTOR
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With Q. M. & B. Switch (silver plated contacts) No. 653 **6/6** each

Without Switch No. 651 **3/-** each

DELIVERIES FROM STOCK

No longer any need to accept any but the best—thanks to increased production the connector that everyone wants is now in plentiful supply.

- Made to B.S. 562.
- Visible earth terminal.
- Independent cord grip; no strain on conductors.
- 2-part phosphor-bronze ringed contact sleeves.
- Extra solid bakelite housing.
- Each one packed in a carton.

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Stirling BOILERS

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STOURPORT POWER STATION

The LARGEST SLAG TAP FURNACE

IN EUROPE

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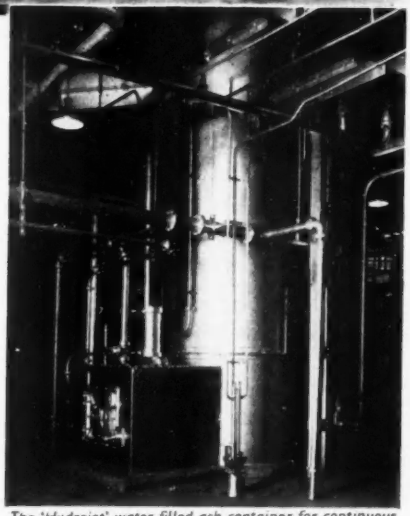

The 'Hydrojet' water filled ash container for continuous quenching and disintegration of the molten slag (power operated gate and discharge chamber in foreground).

The Stirling Boiler Company Ltd. has just commissioned for the British Electricity Authority (Midlands Division), at Stourport 'B' Power Station, the first boiler unit in Great Britain with a slag tap furnace, from which the ash is removed in a molten state. This installation also has the distinction of being the largest boiler in Europe with this type of furnace.

Consulting Engineers:
Ewbank & Partners Ltd.

THE STIRLING BOILER COMPANY LIMITED

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HIGGS MOTORS LTD.

CHAIRMAN WALTER F. HIGGS M.I.E.E.

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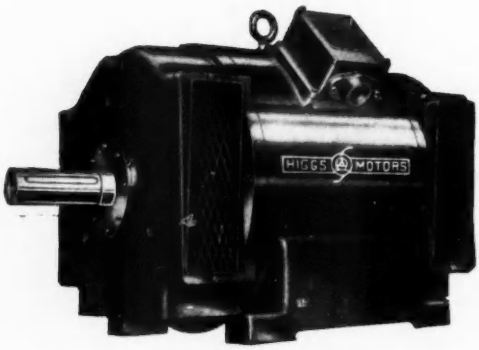

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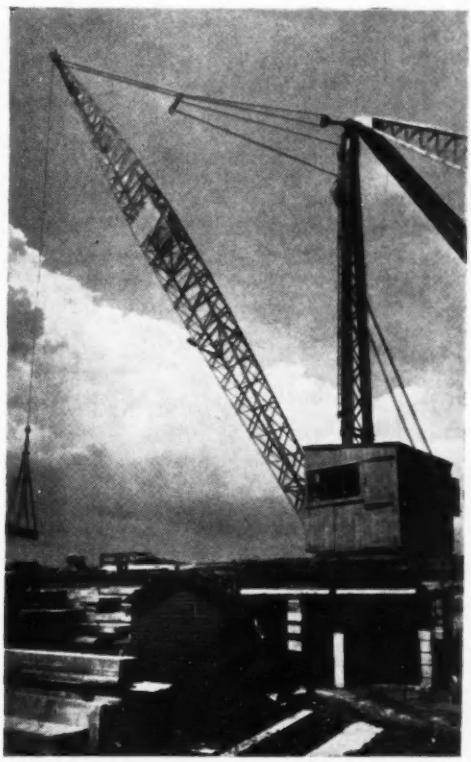
'ENGLISH ELECTRIC'

industrial motors

Cranes handle the world's trade

So much depends on cranes. Dock cranes, yard cranes, gantries and simple hoists that handle the products of nations on their long road from producer to customer. The very ships and locomotives which are the backbone of the world's transportation system could not be built without cranes to handle frames and plates, boilers and machinery.



These cranes which carry so literally the burden of international trade are only as good as their driving motors. In a crane motor dependability is vital. Ability to handle varied loads in intermittent operation, year in, year out in all climatic conditions and temperatures is fundamental to the job. Easy servicing and good accessibility are essential—a crane should never be out of service.

Long experience has proved the ability of 'English Electric' Crane Motors to meet all these requirements. They are in use throughout the world in the service of trade and industry.

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Industrial Motor Works, Bradford

WORKS: STAFFORD · PRESTON · RUGBY · BRADFORD · LIVERPOOL

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In the air, on sea or on land, all scientific triumphs call for the finest and most reliable equipment.
Therefore when cables are required, always specify

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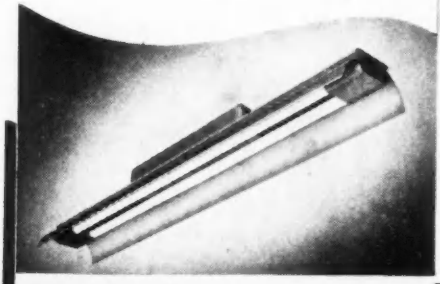
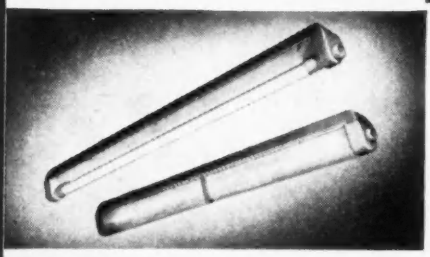
Lighting WITH A PURPOSE



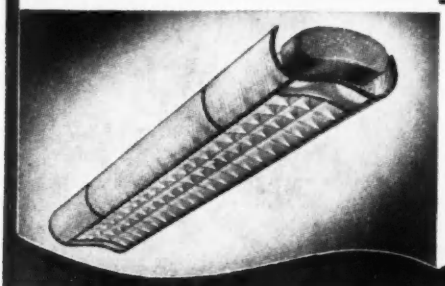
FE/2081.

This ATLAS fitting throws a better light on many industrial problems. And it's able to "stick at it" because of the "Miracoat" finish that defies corrosive atmospheres. It has two 80 watt lamps.



FB/0081.

A cheery fellow this. In its working dress, it is a simple soft 80 watt batten light, throwing out direct and reflected illumination in factories and offices. But clothe it in its diffuser and you have a unit which fits happily into many surroundings.



GN/2040.

No photograph can do justice to the GN/2040, in its decorative diffuser. The downward light from the louvres, the soft glow through the side panels (which is also reflected from the silvered end caps), make it a fountain of light. It carries two 4 ft. 40 watt lamps.

The ATLAS fluorescent lighting catalogue gives full details of these and other ATLAS units. It contains useful information on fluorescent lighting that will be of value to you. Have you a copy?

ATLAS FLUORESCENT

IN 'NORTHLIGHT', 'DAYLIGHT', 'WARM WHITE' & 'PEACH'

THORN ELECTRICAL INDUSTRIES

THORN ELECTRICAL INDUSTRIES LTD.
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Burco

ELECTRIC WASHBOILER

Cat. No.
E840

DESIGNED FOR LONG TROUBLE-FREE SERVICE

MANUFACTURED BY AN ORGANISATION WHICH CONCENTRATES ON WASHING APPLIANCES

DETAILS PERFECTED TO A HIGH DEGREE

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Type **HM**

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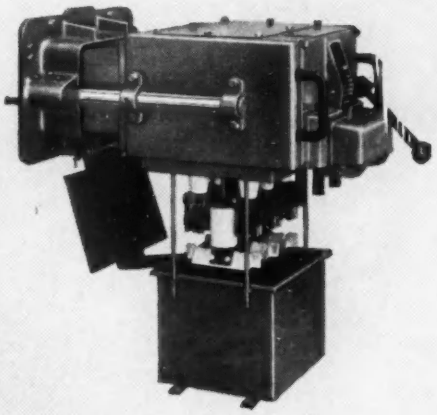
HORIZONTAL DRAW-OUT

First-class design, materials, manufacture and finish all contribute to the renown which this range of Switchgear has won over a period of years



INDUSTRIAL SWITCHGEAR

J. G. STATTER & CO. LTD.
82 VICTORIA STREET, LONDON, S.W.1

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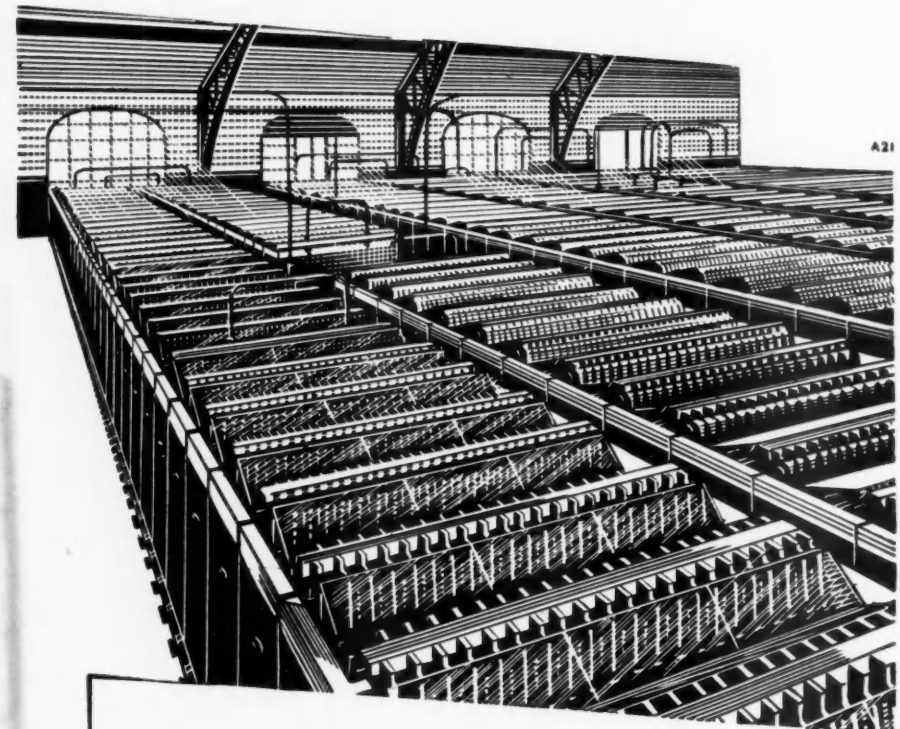

A21

Alton is a big name in the export market. These good batteries, in capacities from 10 to 15,000 ampere-hours, are in service in sixty-five countries. Alton is ready to meet orders from any part of the world and to give firm delivery dates

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Alton, Hants: Telephone: Alton 2267 and 2268
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Alton can also supply renewal plates for all makes of battery, British & Continental

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on

B.I. Callender's

CURRENT COLLECTION EQUIPMENT

Engineers concerned with the use of electrically-operated cranes, conveyors and hoists, etc., will find in this book useful information on BICC's wide variety of Current Collection Equipment.

The range includes conductors, supporting insulators and accessories as well as current collectors. This equipment is available in complete collector units or as individual components — a few of which are shown here. Write to-day for Publication 271R.

BRITISH INSULATED CALLENDER'S CABLES LIMITED
NORFOLK HOUSE, NORFOLK STREET, LONDON, W.C.2

Why this machine is a pleasure to sell

(and profitable too, of course)

AC/DC
200-250 VOLTS
or
100-125 VOLTS

World patents pending

It is designed on entirely new principles.
It is made by one of the foremost firms of precision engineers in the country.
It has been subjected to the most severe of tests by practical housewives.
Every job it does, it does perfectly.
It is simplicity itself to assemble, to operate, and, not least, to clean.
It is practically trouble-free.
And incidentally, it is very handsome.

THE 'LAMMIX' MIXES, MINCES, BEATS, WHISKS, KNEADS, GRATES, SLICES, MAKES SAUSAGES, EXTRACTS JUICE, ETC., ETC.

Apply to address below for full details.

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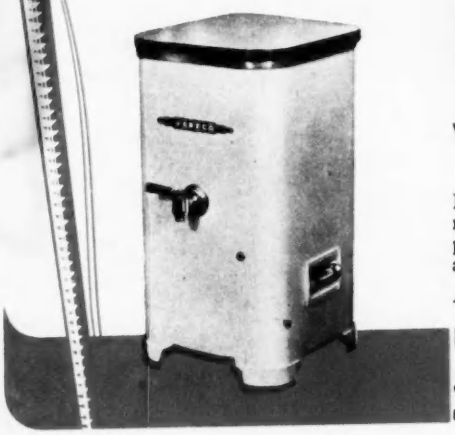
VERSCO

WASHDAY APPLIANCES



This VERSCO de-luxe "SQUARE" Wash Boiler is an example of the high standard of manufacture maintained throughout the complete VERSCO range of electric wash boilers and washing machines.

A fully illustrated leaflet is available on request.

UNIVERSAL BOILERS & ENGINEERING CO. LTD.

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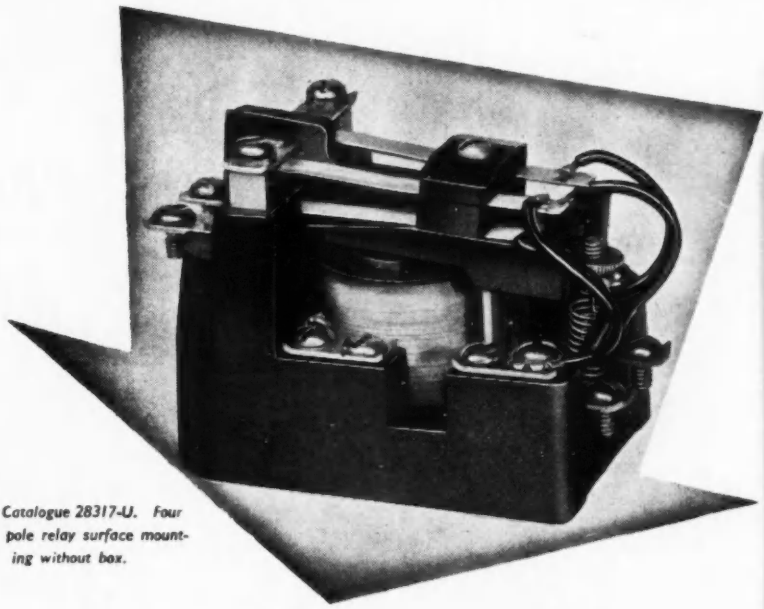
ARROW

PRECISION BUILT

MIDGET RELAYS



Catalogue 28317-U. Four pole relay surface mounting without box.

The most exacting specifications can be met by the ARROW midget relay. Many circuit arrangements may be built up on a moulded base from standard parts.

The contacts are silver to silver butt type amply proportioned to give a continuous rating up to 10 amps per pole at 220 volts A.C. Operating coils of low wattage and continuously rated — less than 3 watts D.C. — can be supplied for various voltages from 6 to 550 A.C. and from 6 to 230 D.C.

Available up to 4 poles normally open or normally closed, alternatively with various combinations normally open and closed. Supplied as illustrated, enclosed or for panel mounting.

ARROW midget relays are individually produced . . send NOW for full details.

ARROW ELECTRIC SWITCHES LTD

HANGER LANE · EALING
LONDON · W.5
Telephone: Perivale 4451

For reliability...

The outer sign of Inner Quality

EH

HEAVY capacity direct-current "Erskine Heap" Switchboard supplied many years ago and still giving good service in a large Gas Works in Britain.

May we have your enquiries?

We Manufacture:

SWITCHGEAR 50/5,000 Amps. CONTROL GEAR ¼ H.P./5,000 H.P.

ERSKINE, HEAP & Co LTD

SWITCHGEAR SPECIALISTS

Head Office and Works
BROUGHTON, MANCHESTER (7)

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BRANCH OFFICES AND AGENCIES IN ALL PARTS OF THE WORLD

611

12

REASONS WHY
YOU SHOULD USE
Aluminium
ALLOY CASTINGS

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to
corrosion

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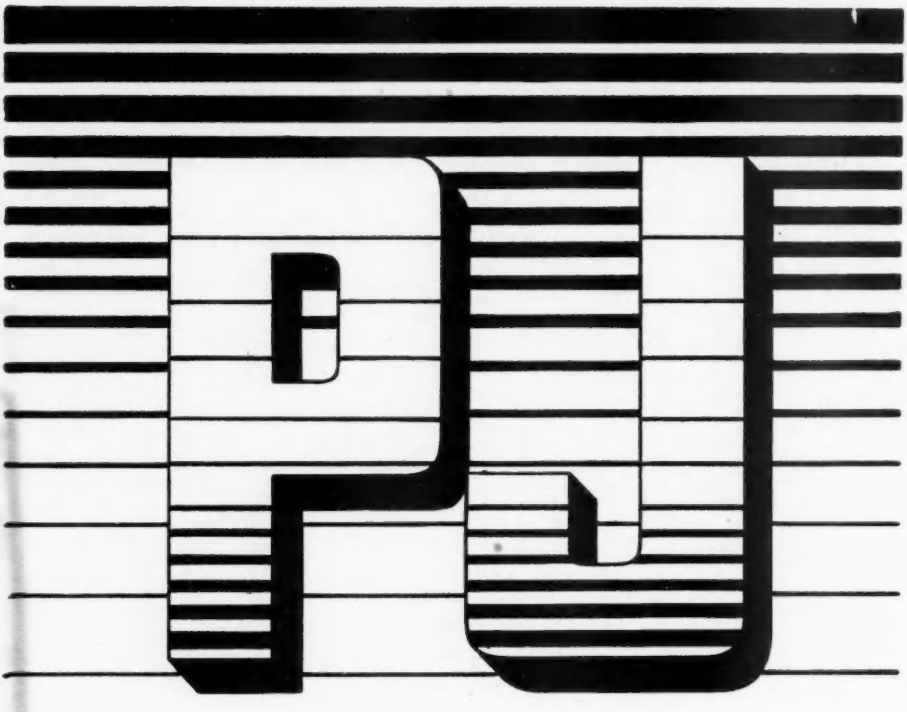

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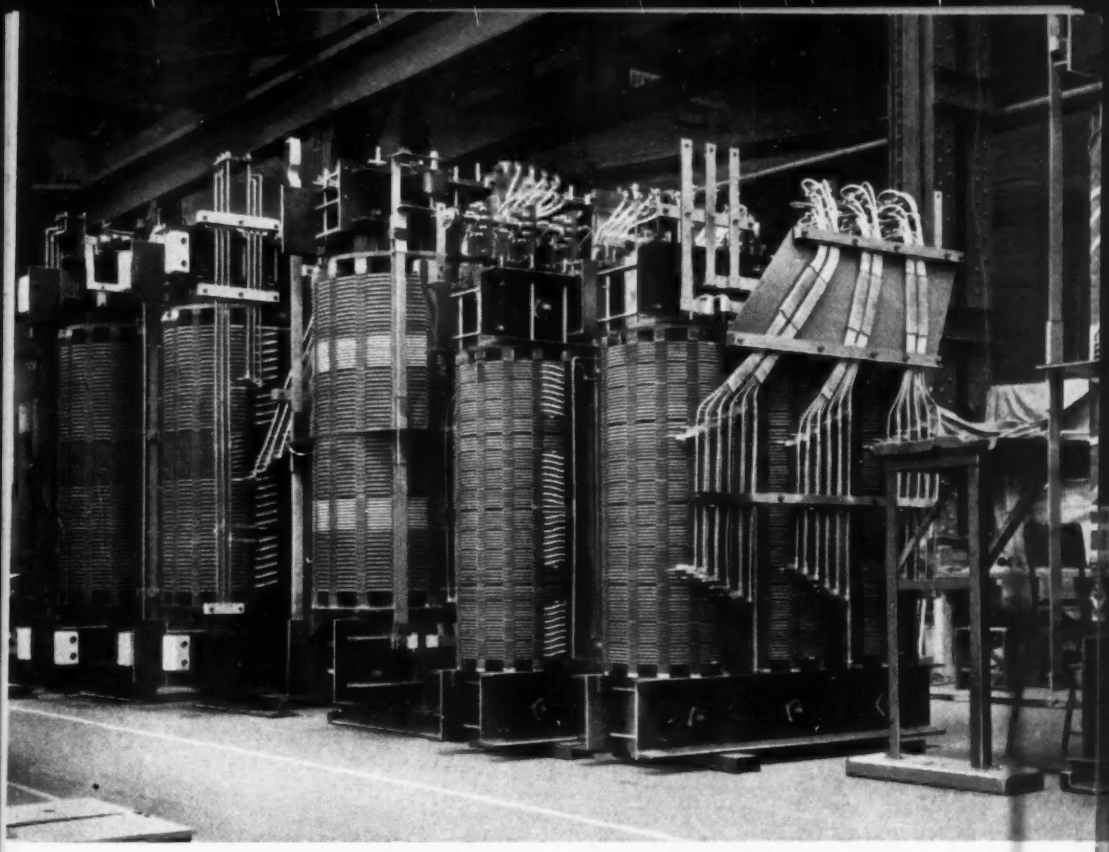
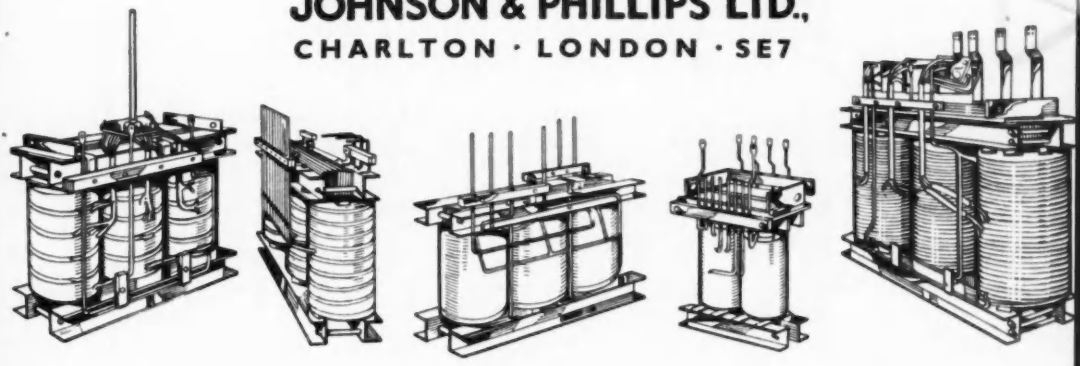


NOT ALL MVA's

Not all the transformers we build are measured in MVA, but our reputation for building transformers with "plenty to spare" certainly seems to be attracting a lot of large jobs our way. The three 15 MVA units on the left are for the B.E.A.; the two 4 MVA units in the centre are for the N.C.B.; while the 10 MVA unit just showing on the right is for Australia. When you're needing a big unit - or a little one - it's worth remembering that a J.& P transformer has "plenty to spare."

JOHNSON & PHILLIPS LTD.,

CHARLTON · LONDON · SE7



AN ANNOUNCEMENT
BY
TELCON and J. & P.

To give cable users an even better standard of delivery service, and in particular to enable them to deal with urgent requirements with the minimum of delay, The Telegraph Construction & Maintenance Co. Ltd. and Johnson & Phillips Ltd. announce that they have pooled their manufacturing resources for the production of stock quantities of Mains Cables to established C.M.A. standards.

By combining existing stocks and establishing a joint programme for future stock production, the two Companies offer collectively a more comprehensive range of Mains Cables than hitherto, and will hold the stock items in larger quantities.

The Works or the nearest Branch Office or representative of either Company will gladly deal with enquiries, and whilst to implement the arrangement each Company may supply cable manufactured by the other, the Company effecting the sale will accept full responsibility under its normal conditions of sale for the material supplied.

If you are not receiving a monthly list showing the combined stocks available, a request addressed to either Company will ensure your inclusion on the mailing lists.

THE TELEGRAPH CONSTRUCTION & MAINTENANCE CO. LTD.

GREENWICH, LONDON, S.E.10

JOHNSON & PHILLIPS LIMITED

CHARLTON, LONDON, S.E.7

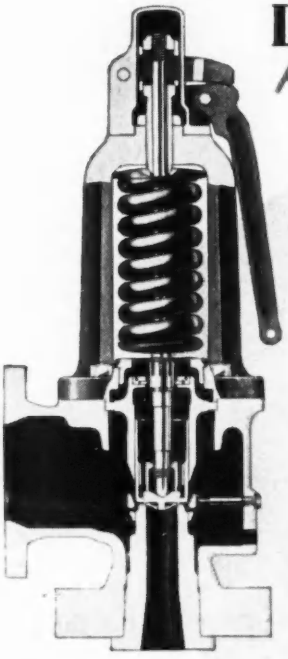
TELCON

MEMBERS OF

THE CABLE MAKERS ASSOCIATION

A CONSTANT OF 44

DEWRANCE-CONSOLIDATED
FULL-LIFT SAFETY VALVES



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The high capacity and low blow-down of Dewrance-Consolidated Full Lift Safety Valves has recently been demonstrated by very successful high pressure, high temperature capacity tests carried out in co-operation with the B.E.A. and associated authorities.

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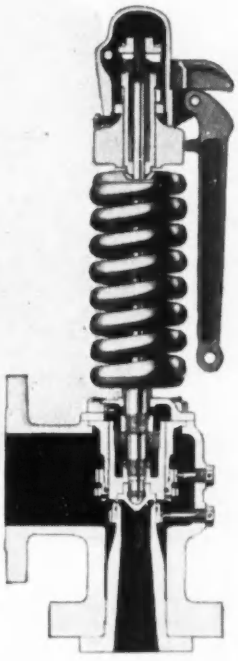

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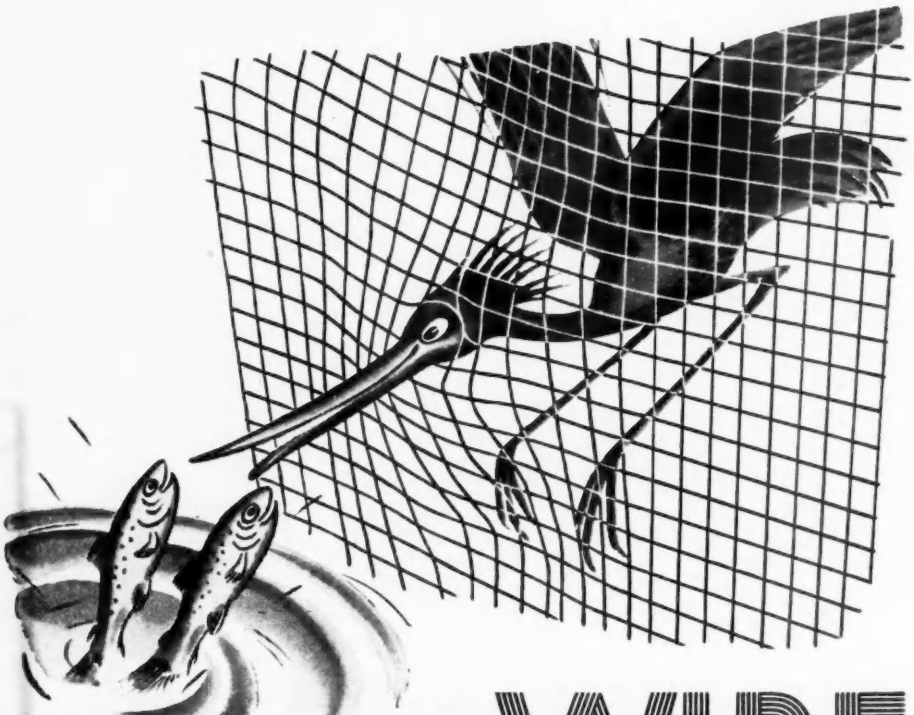

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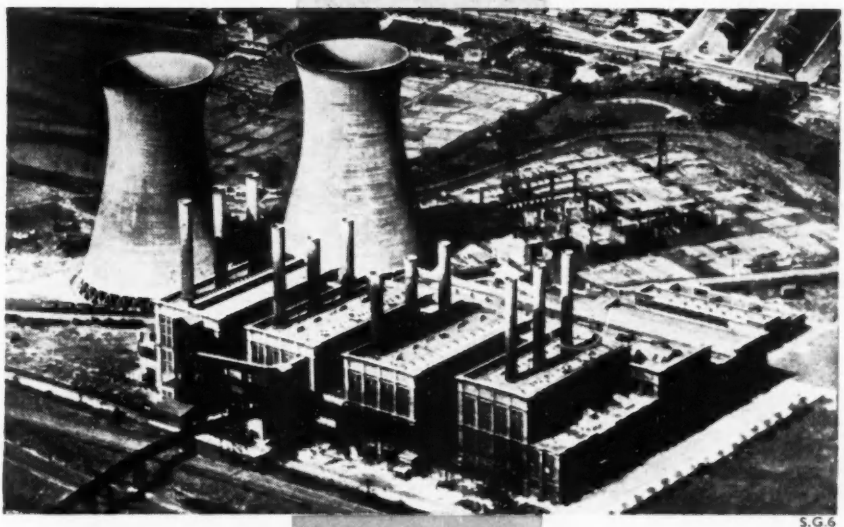

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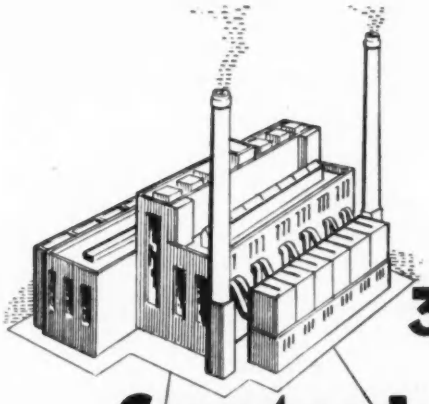

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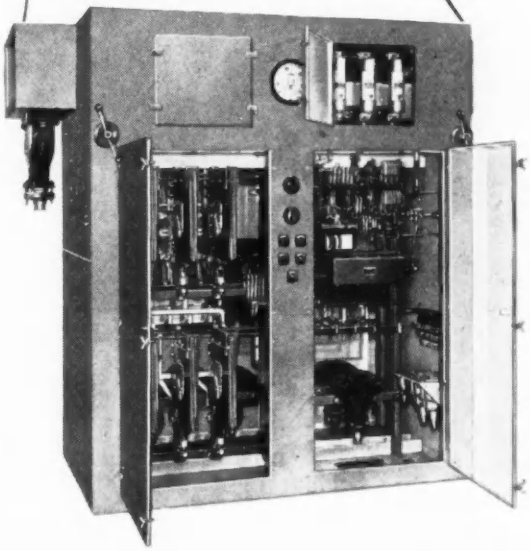

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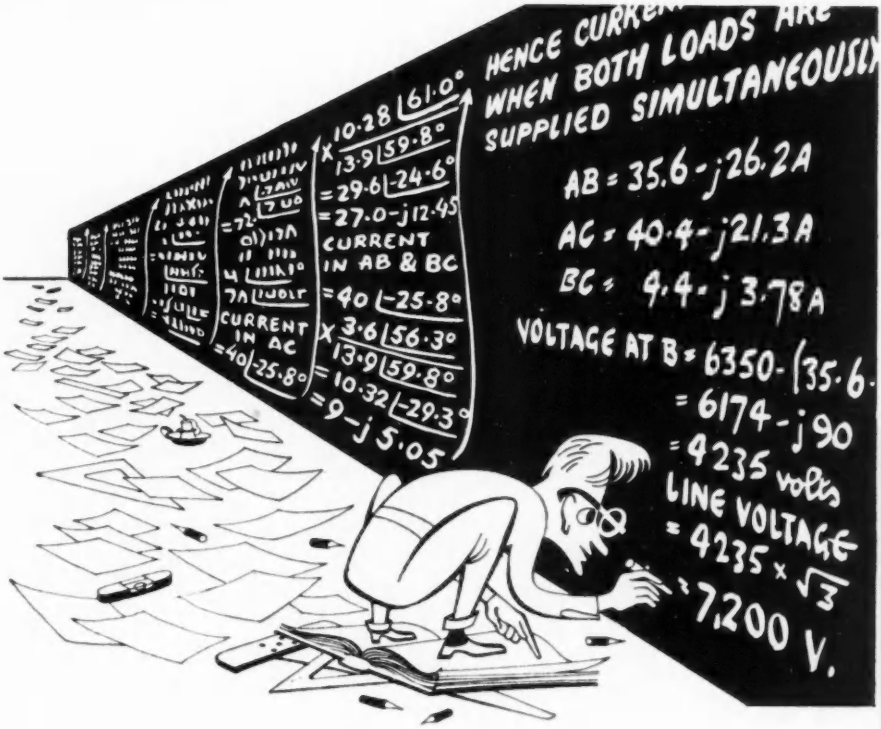
P.435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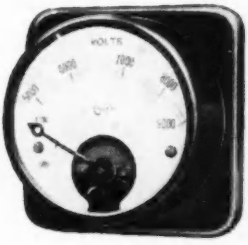

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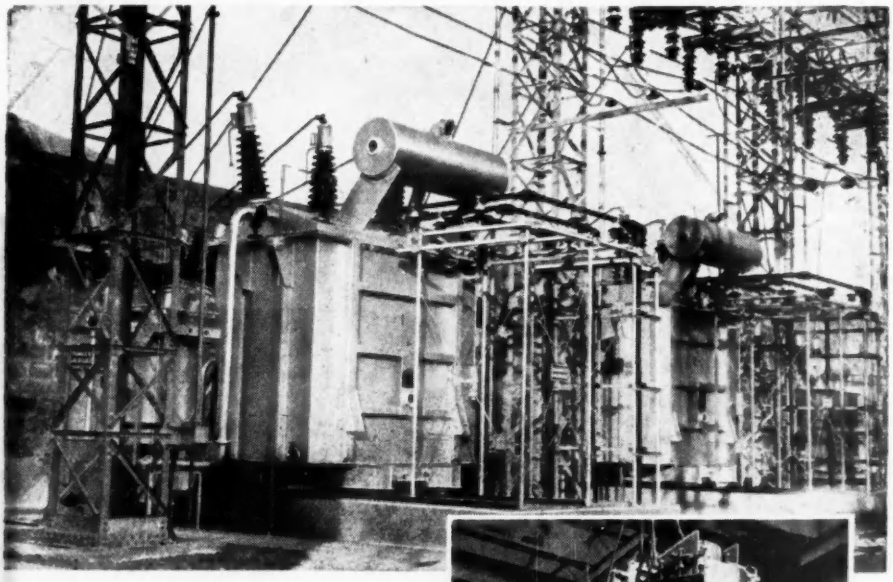

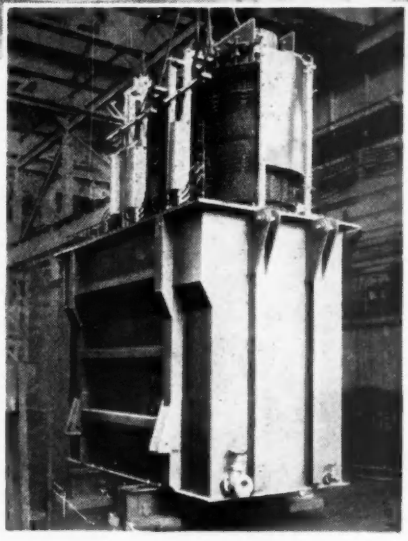

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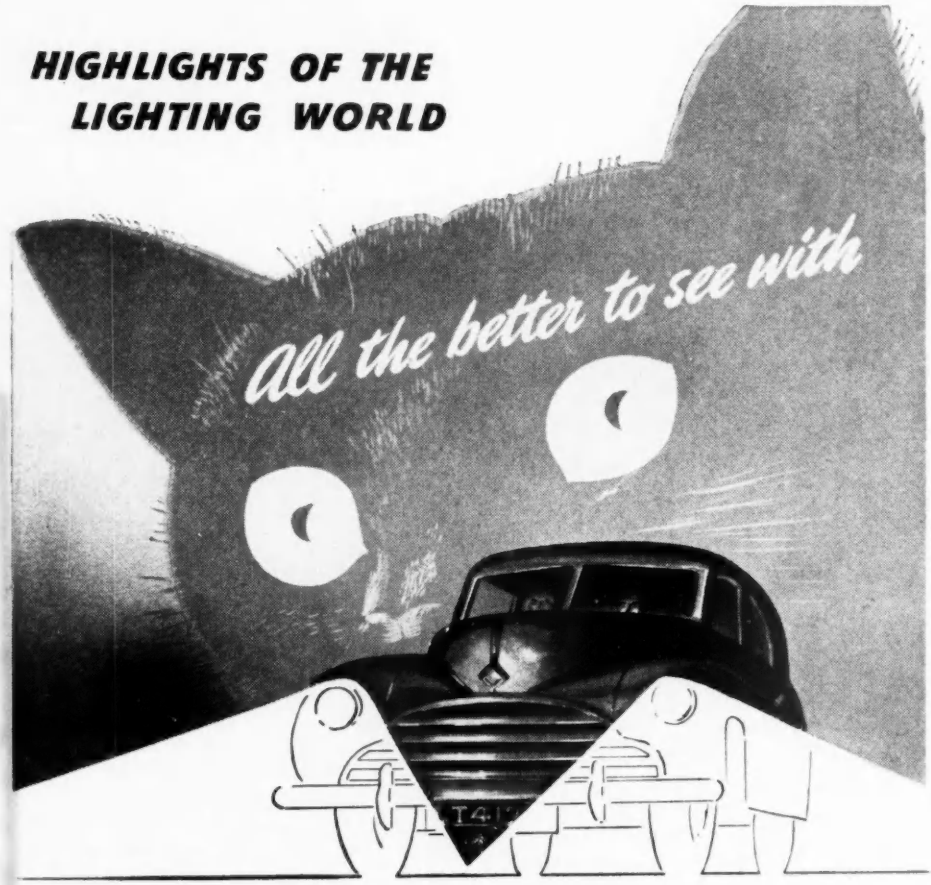

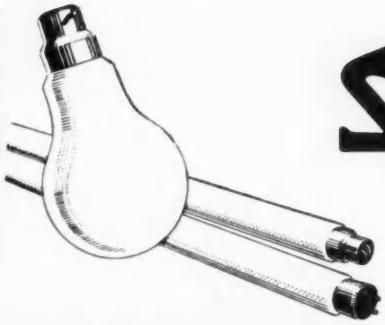

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ELECTRICAL TIMES

Vol. 119 No. 3089 THURSDAY, 18 JANUARY, 1951

SIXTIETH YEAR OF PUBLICATION

PUBLISHED EVERY THURSDAY

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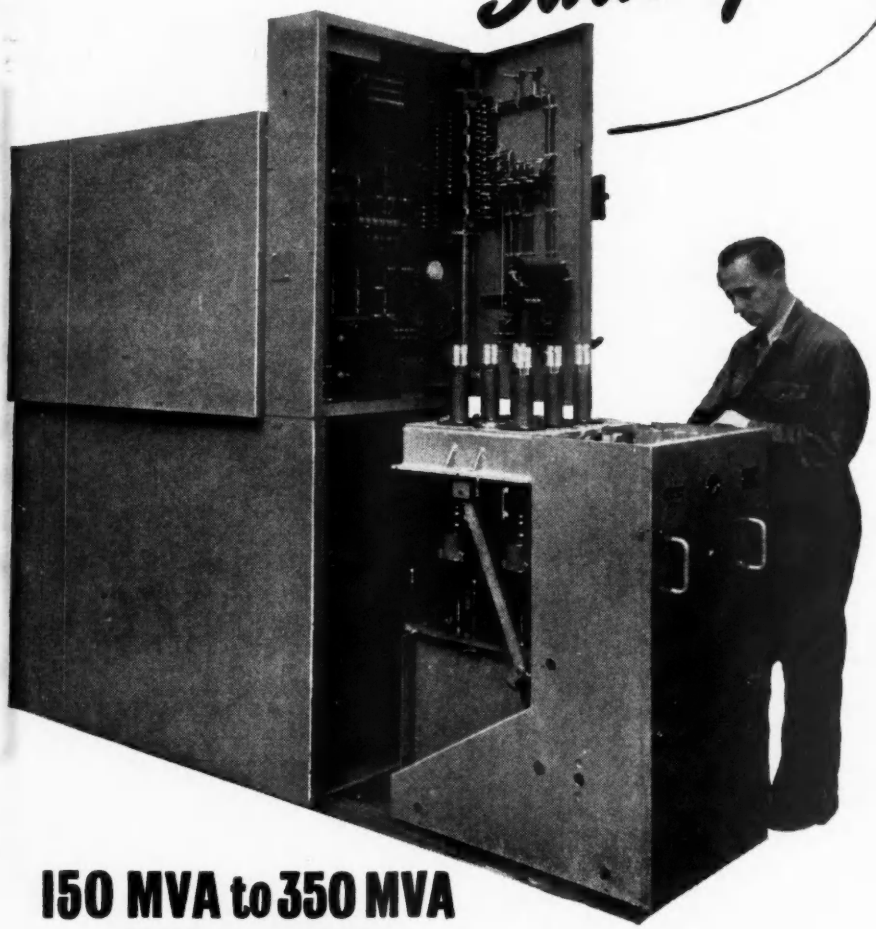

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Editorial

LOWLAND TACTICS

SURELY the motto of the South East Scotland Board must be "Nothing is lost by asking." Their claim for specially favourable treatment in respect of the allocation of reserves vesting in the B.E.A. was urged so strenuously that it achieved the invidious distinction of a special mention in the second B.E.A. report. Now they are at it again. They are not satisfied with the proportion of the payments in lieu of rates, with which they are charged. These payments of course, are charged in one total sum on the Central Authority, which then issues precepts on the individual area boards for amounts determined by their size. Since, however, rates in Scotland are lower than in England it follows that the S.E. Scotland Board is required to pay more than the actual amount which would be charged on its own undertaking, and it is this subsidising of the Sassenach to which the Scots of Edinburgh object. They appear to overlook that one of the purposes of the 1947 Act was to iron out local differences, and most area boards could find reasons for special exemptions if they were so minded. However, if the Board's objection is the more basic one of bawbees crossing the border, they have the consolation that some will go back in subsidies for electrification under the Hill Farming Act.

SURVEY BY O.E.E.C.

THE technical development of thermal power stations is an exceptionally wide field and in consequence the recent survey by the Organisation for European Economic Co-operation rightly attempts no more than a broad picture of the major features. Necessarily, the predominant theme becomes one of comparison between European and American practice, and the conclusion is reached that neither has superiority in technical development. The fundamental differences in these two industrial spheres are attributed to the greater diversity of manufacturing firms in Europe, which probably accounts for such special designs as the radial turbine, and the superiority in gas turbine technique; while the fewer manufacturers and greater market in the U.S. have led to the development of larger units and wider use of higher steam conditions. Throughout the survey there is a noticeable preoccupation with the larger generating sets, a background which shows up in sharp relief the solitary B.E.A. 100 MW set on order. Comment is also made on the apparent lack of European interest in reheating which, it is suggested, may be due to the inferior load factor, but with the rising cost of fuel and the large-scale interconnections now being developed, the extra capital expenditure on reheating to acquire the 2% further efficiency may now be considered worth while. Finally, a table of delivery periods of generating and boiler plant shows clearly the generally accepted fact that although other countries are behindhand, none is so badly so as this country.

PREPAYMENT ANALYSIS

PREPAYMENT meters are generally unpopular with supply authorities. They cost more to buy and more to run, and though they help the poorer consumer to keep abreast of his financial commitments, their advantages have not been so notable as to prevent some authorities desiring to be rid of them. Area Boards have been giving close attention to their policy in connection with such meters, as was shown by many references in the recently published annual reports, while in parts of South Wales, extra charges for the meters were recently removed. It is against this background that some figures on the subject in the new B.E.A. Utilisation Research report have a special interest. The results of this analysis suggest strongly that prepayment facilities encourage people to install electric cookers,

and in the lower income classes this reflects in a higher total installed load. Unfortunately, the investigation has not gone far enough to set a value on the extra revenue accruing, and so to determine how far the extra costs incurred are offset. The full answer may be hoped for from the further investigations hinted at in the conclusion of the report. It will certainly be a valuable addition to our knowledge of electricity supply economics.

ONE, TWO, THREE

JANUARY brings a ruling off in many tables of figures which a technical industry has to collect as a measure of its progress, amenable to critical examination and analysis. The new year seems, therefore, an appropriate time to think about statistics and their use, and to question to what extent is justified the often repeated gibe that they can be used to prove anything. Engineers, by their training, are better equipped than most people to handle and interpret tables of figures and graphical presentations, but even in such professional circles there is much cynicism about "facts" based on figures. It is true that statistics are often presented as persuasive support for some unlikely hypothesis: it is equally certain, but less frequently realised, that a critical examination of how these totals are derived, and of what is their margin of error, will usually reveal their worth as evidence or premise. It is this careful suspicion of figures which is too often discarded in favour of the mentally easier wholesale condemnation of all statistics. Yet tables and graphs can compress much information into the little space and little time usually available nowadays, and they have a utility few would wish to lose.

HABITS AND THE GRID

SOCIOLOGY is hardly a subject for exact measurement, but it is surprising that its practitioners have not discovered the useful mass sociological information which can be obtained from the instruments at National Control. Before the war the ELECTRICAL TIMES published some load curves showing the sharp increase at 4 a.m. when the Test match scores were relayed from Australia. Now that the supply network has been regionalised and it is possible to sit in a comfortable chair in Paternoster Square and study the habits of the public within those regions, it seems a pity that someone has not made a proper examination of these load variations and their interpretation. Whether it be an assessment of the average hour the public eats its Sunday meal, or a determination of the effect of Hogmanay in Scotland and the duration of its hangover, the information is there to be had. True, it would be no easy matter to translate the precise measurement of electrical energy into data of flesh and blood and behaviourism, but at least certain broad trends would be discernible and that is about the limit to which sociology normally takes us.

Meteor

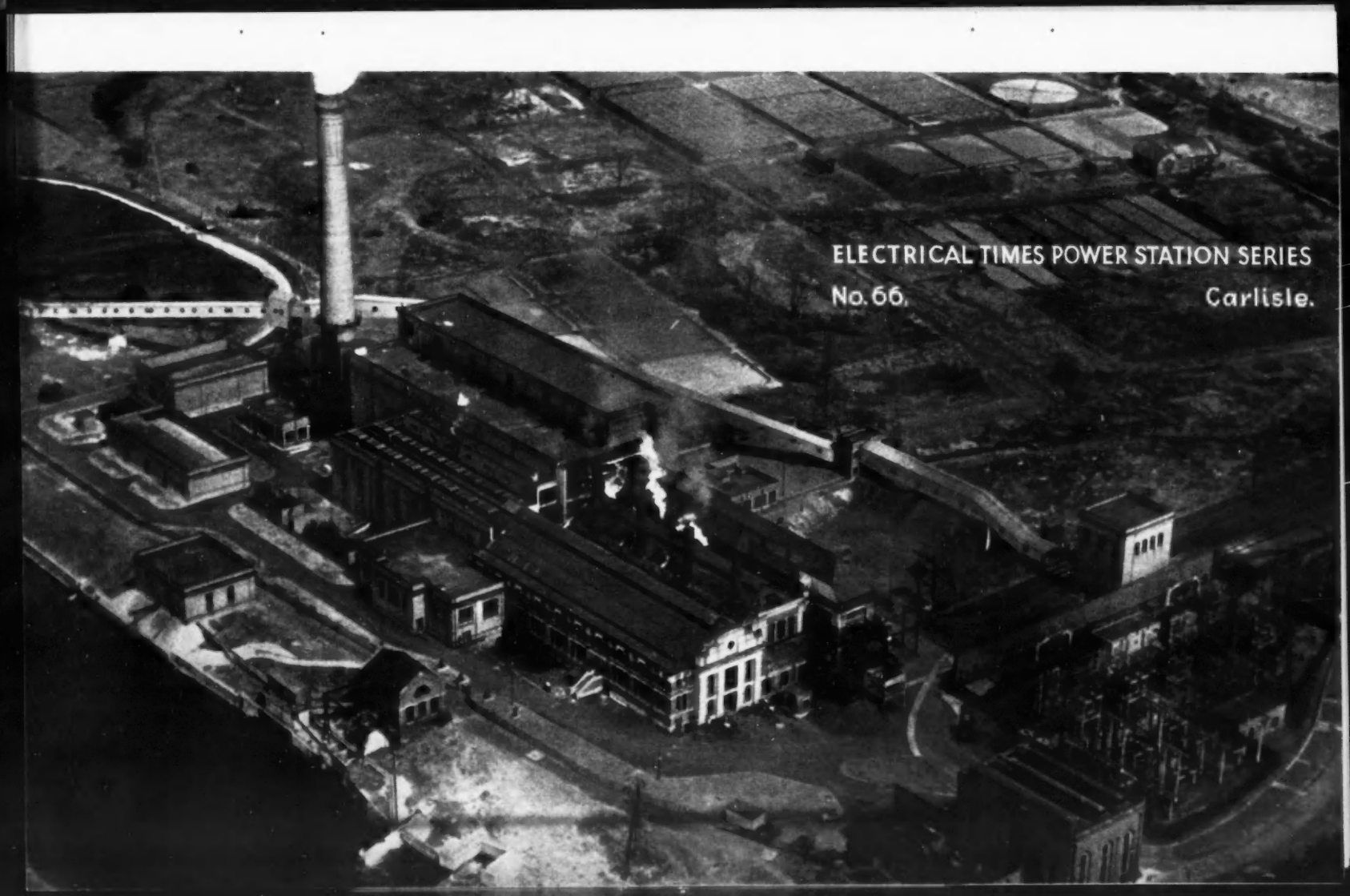
THIS WEEK'S PHOTO

CARLISLE generating station is operated by the North Western Division of the British Electricity Authority, and is part of the Manchester Grid Control area. The station, situated at Willowholme, was built by the Carlisle Corporation—the first installation being two turbo-alternators of 2·4 MW, and 3·6 MW capacity, in 1927 and 1928—these having been removed from the original station site at James Street, which is now a distribution substation. Extensions were carried out in 1927 and 1930, comprising a 7·2 MW and a 15 MW turbo-alternator of B.T.H. manufacture, together with Stirling boilers—one of 25 klb/hr and seven of 30 klb/hr, operating at 250 p.s.i. and 650° F.

Further extensions were commissioned in 1943 and 1944, consisting of two 30 MW B.T.H. turbo-alternators generating at 11 kV, connected to the 33 kV busbars by generator transformers. The steam raising plant consists of five Stirling boilers, rated at 150 klb/hr 625 p.s.i., and 840° F., which are fitted with I.C.L. chain grate stokers. Circulating water is obtained from the River Eden. The station's combined output capacity is 78 MW.

Distribution for local use is at 3·3, 11 and 33 kV. There are two 20 MVA, 132 kV grid transformers and two 25 MVA, 66-kV transformers, the latter feeding Stainburn and Egremont, which form part of the Cumberland ring.

For the year ending March 31, 1950, the combined station's operating results were: units sent out, 354 millions; thermal efficiency, 21·12%.


ELECTRICAL TIMES POWER STATION SERIES
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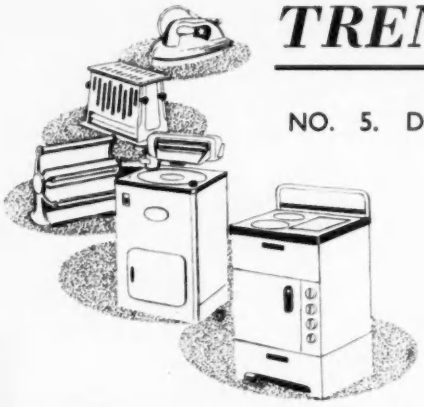
Carlisle.



TRENDS in DESIGN

NO. 5. DOMESTIC APPLIANCES and APPARATUS

by Dame CAROLINE HASLETT, D.B.E., J.P.

THE design of domestic electrical apparatus has followed the general trend in the planning and equipment of today's homes. As unnecessary ornamentation has disappeared from the exterior and interior of the modern house, so have irrelevant crevices and ridges been eliminated from the equipment it contains.

The Importance of Line

Attention is now concentrated on the functional and aesthetic value of line, for it is recognised that the two are inseparable. The appearance and the performance of modern equipment are equally important. Today, housewives are not content with an appliance which looks pleasing, but does not work well. On the other hand, the alternative is certainly not an efficient but ugly piece of apparatus. The wide range of present-day materials enables attractive and efficient apparatus to be produced in differing price ranges. For instance, electric kettles or irons can be obtained with the same type of heating element, but having different finishes, in the case of kettles in enamel, copper, aluminium, chromium, or nickel-plate, or in the case of irons in sprayed metal, chromium or porcelain. But, though this choice exists, the general rise in the price of most commodities means that housewives have to watch their budgets more closely, and are, therefore, unable to buy as much new electrical apparatus as they would like; this in turn, must be reflected in a certain stagnation of design.

The availability of materials and labour will, of course, play a great part in the future radical developments in design, as the use of any which are in short supply automatically increases the price of the appliance, and thereby restricts its appeal for a large number of would-be purchasers. Increased prices of raw materials and the continuance of a high purchase tax on some classes of apparatus are two factors which hamper the designer's efforts.

A Planned Scheme

A plain, but pleasing line is desirable not only because it is more attractive in itself to modern eyes, but because it means that the appliance in question can fit more easily into the plan of the modern kitchen. In the early days electrical appliances were regarded as "extras", now they are an integral part of the home, especially in the kitchen. No longer do they appear in splendid isolation, but their design has developed in accordance with the growing appreciation of kitchen planning. Moreover, a clean line makes for cleanliness in use, and for easy cleaning afterwards, both points which are particularly important in small houses and flats.

The exigencies of space have an important bearing on design of apparatus, for the housewife is often torn between buying an appliance which is big enough for her needs, and will yet be housed fairly unobtrusively when not in use, and a smaller apparatus which takes up less room, but is not nearly equal to the family requirements. It is a great boon in a small house to have an electric washing machine whose wringer can be stored inside the cabinet, and where an enamel cover can be placed over the top of the washer. The splash plate of the cooker which will fold down to cover the hob when not in use also adds to the general neat appearance of the kitchen, and means that articles can be temporarily placed on the cooker top. Again, the water heater providing hot water for sink or bath, which can be installed under the draining board and operated by a foot switch, is another advantage where space is limited.

Changing Ideas on Space

Present-day views on the use of space differ greatly from those of fifty years ago. Then, ample space was allowed in the kitchen, but

little heed was paid to the way in which it was utilised. Vast distances were walked carrying out, say, a week's duties, and much bending and stretching was entailed in cooking and storing foods. The pendulum then tended to swing to the other extreme, and the kitchen became too small. Now, however, a happy balance is being struck in the size of kitchens, which, in turn, is reflected in the design of apparatus. Developments in engineering techniques are resulting in the motor and/or element of appliances becoming more compactly accommodated, leaving the maximum amount of space either as cubic capacity in the case of cooker, refrigerator or washing machine, or as area in, say, the sole plate of the iron without increasing the weight.

The uninterrupted line in design is further made possible by the increasing compactness and neatness of switches, which are often flush with the surface of the appliance, as they are also flush with the wall surface. Here may be mentioned the unobtrusive modern cooker control unit in plastic (sometimes housing a spare fuse for a fused plug) which contrasts with its clumsy iron predecessor.

Changing Living Habits

Perhaps the habit of taking some meals in the kitchen or in an adjacent dining alcove, which was accentuated by the war, has influenced the design of cooking apparatus, and has given much of it an almost "sitting-room" appearance. Certainly there is an increasing number of cooking appliances which can be happily used for a "sitting-room service." These range from the baby cooker with grill boiler, boiling plate and small oven suitable for limited needs, to the really elegant apparatus such as electric hostess trolleys, coffee percolators, kettles and warming plates. Changing living conditions will certainly continue to influence design of apparatus, for if we should ever return to the now seemingly gargantuan family meals of pre-war days then presumably cookers and refrigerators would become larger in size. One recent point which meets a need in a small kitchen is an extension hob to the cooker giving either an additional heating surface or standing room for utensils.

Two Main Requirements

There would, therefore, seem to be two main requirements, broadly speaking. One is for apparatus of full size and designed for use in a well planned kitchen catering for a family. The other is for a smaller type of apparatus which can be used for more intermittent needs, and which can be built up to give a full service on occasions. In both cases portable appliances fulfil many needs but their efficiency of course, depends on an adequate wiring installation with a sufficient number of conveniently placed socket outlets.

The realisation that a home should be generously wired from the start will contribute to variety in design, for as long as people are content to use apparatus from a limited number of outlets there must be a restriction in the type of appliance used. For instance, low temperature heating is proving its value more and more, in the form of thermostatically controlled convectors, tubular or panel heaters, There would seem to be great scope here for improved designs for domestic use, as low temperature heating is a method which is both safe and economical in its use of current.

Safety as Part of Design

Here may be mentioned the growing emphasis on the need for radiant fires incorporating an adequate fire guard as part of the original design, and it is interesting to note that three well known manufacturers have recently made a special point of this.

Another example of design for purpose is that of the electric kettle where the handle is so shaped as to direct the hand away from the steam. This is also true of irons which are now designed to incorporate several features at once—pleasing appearance, maximum convenience in holding and speed in passing over the garments, adequate weight and adequate loading of the element.

Unit Equipment

Standardisation of dimensions, especially of cooking surfaces, has resulted in the unit type of equipment for the kitchen, which is such an advantage to households who have to add to their apparatus as and when the family purse allows. It is interesting that a new horizontal type of refrigerator has appeared which is, in some ways, a companion piece to the horizontal cooker, although this particular refrigerator is of the de luxe variety. While preserving the continuity of the working surface, these appliances, but more especially the cooker, eliminate undue stooping. It is, of course, difficult to decide on standard dimensions, in view of the differing height and physique of different housewives, and the solution would be adjustability. This has been met in the recent revival of an electric washing machine with telescopic legs. In this matter of adjustibility there is much scope for im-

provements in structure, which will, of course, involve alterations of design, but which will go far towards making electricity the perfect servant.

The Household Wash

As family eating habits are reflected in changes in cooking apparatus, so laundry customs are seen in laundry appliances. Will it be the rule in, say, twenty years' time for all household laundry to be done at home using washing machines which are entirely automatic and self-emptying, and ironing apparatus of the press ironer or rotary type with suitable provisions for frills and fine work? There are at present several varieties of driers or airers available, from the full size drying cabinet to the combined nursery heater and airer. No doubt the next few years will see increased variety in the design of these.

Automatic time and temperature control is one of the most valuable features of today's appliances, and in the future housewives will hope to find it as a normal part of all apparatus, whether for heating, lighting, cooking, refrigeration or laundry.

Lighting is, of course, a whole field in itself, and here housewives hope that experiments in the design of fluorescent lighting fittings and the use of fluorescent powders will give greater variety in this form of lighting for home use. There would seem to be room for more imaginative design in filament lighting fittings, using both new and old types of material and the bursaries offered, for instance, by the Royal Society of Arts should do much to stimulate young designers.

CANADIAN POWER IN 1950

DETAILS of electricity generating plant development in Canada during 1950 have recently been issued by the Department of Resources and Development (Water Resources Division). The total installed capacity of water-power plants in Canada is now 12,655,000 h.p., of which 1,037,275 h.p. was added in 1950. This total represents the exploitation of less than 23% of the total available water-power. New plants and extensions under active construction total about 1,000,000 h.p. and those under preliminary construction or definitely planned are tentatively rated at 1,500,000 h.p.

During the year the demand for hydro-electric energy continued to expand, but due to the intensive construction programme, power production in general kept pace with the load, with the exception of Southern Ontario where an unusually rapid load growth was experienced resulting in difficulty in meeting all requirements.

Major Schemes

It is impossible in our available space to detail all the large schemes completed or in hand. The following items are therefore some of the more interesting highlights. The British Columbia Electric Railway Co., at Jones Lake, have continued design and fieldwork on a project covering the installation of an 80,000 h.p. single unit machine running under a head of 2,000 ft. Civil engineering work on site has already begun. The Aluminium Co., of Canada, are in process of consolidating the Nechako-Kitimat project with an estimated final output of 1,600,000 h.p. An unusual conversion was made in the City of Edmonton's thermal station where three boilers are now being fired on gas, and only two on coal.

Good progress has been made on the Pine Falls development in Manitoba, and it is expected that two units of 19,000 h.p. each will be ready for service at the end of 1951.

In Ontario the Des Joachims plant is rapidly nearing completion, the last set being due to come into operation next month, bringing the station up to its designed capacity of 480,000 h.p. Chenaux, with a final capacity of 160,000 h.p., is expected to be finished in the middle of 1951, and the first section of La Cave, totalling 192,000 h.p., is due for operation in 1952.

The Niagara Diversion Treaty having been ratified by the Governments of the U.S. and Canada, preliminary work is now under way with the Sir Adam Beck Generating Station No. 2. Scheduled for operation in 1954, this station is to have an installed capacity of 600,000 h.p. in six units.

At Toronto, work is proceeding on the Richard L. Hearn Steam Generating Station, and in Southern Ontario, good initial progress has been made on the conversion from 25 to 60 c/s, but the work is expected to take several years.

Shawinigan Water and Power Co., made particularly rapid progress in the La Trenche Rapids scheme, which is expected to attain 320,000 h.p. by summer, 1951.

Our readers' views . . .

Troubles—and Remedies

WE have read with very great interest the article by Mr. S. Spence in your issue of January 4, 1951, but would like to draw attention to a phrase which we think may give rise to some misunderstanding.

On page 14, under the heading "Hot Bearing (Ball and Roller)," the author suggests that if the cause of overheating is the use of the wrong grade of grease, this should be replaced by a suitable grade with *lower melting point*.

May we suggest that it is not an easy matter for the user to determine if the wrong grade of grease has been used, unless he has deliberately ignored the recommendations of the motor manufacturer, the rolling bearer supplier or the lubricant supplier?

The sufferer, therefore, would be well advised to contact one or other of these specialists in the first instance.

The author's recommendation, however, does indicate a fallacy which we fear is all too common. Although we are not prepared to dogmatize about what does happen to a lubricating grease in a rolling bearing, it is probably correct to say that in very few instances indeed does one rely on the "melting" of the grease to give lubrication. In general, it is important that the grease should not melt.

Incidentally, the use of the term "melting point" in connection with modern lubricating greases for electric motor bearings is in itself perhaps misleading, as these are complex materials and do not have a true melting point in the exact sense of the term.

We would respectfully suggest that the author amend his phrase in the chart shown to "replace by suitable grade."

G. L. Cole

SHELL MEX HOUSE, W.C.2 — SHELL MEX & B.P. LTD.

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Automatic Volume Control

IN your editorial of January 4, 1951, under the heading "A.V.C.", Meteor refers to differences in the relative loudness of speech and music in broadcasting programmes. This problem has exercised our minds since the earliest days of broadcasting, and a special study of it has recently been made.

It was realised in the B.B.C. that we should try to control the relative levels of speech and music in such a way that listeners would not find it necessary to rise from their armchairs to adjust their volume controls every time there was a change of programme. In the absence of a "standard listener" whose opinion could be relied upon as typical, we have made tests with a considerable number of listeners to find out what their preferences actually are.

As a result of these tests (which were described in the B.B.C. Quarterly, Vol. III, No. 4, and Vol V, No. 1) we have established that when speech follows music the level should be reduced by four or five decibels, but when music follows speech the level should be increased by only about two decibels. We now try to maintain differences of this order during transitions between one programme and another, and we hope that Meteor has found that the impulse to move his volume control occurs less frequently than formerly.

In the special case where music and speech are closely interwoven in the same programme, the relationship between the two is a matter for a combination of artistic judgment with scientific principles.

E. L. E. Pawley

BROADCASTING HOUSE, W.1

THE MINISTER REPLIES

IN last week's issue we referred to a protest meeting by technical and clerical staffs of the former London companies, at which a resolution was passed asking the Minister of Fuel, and Lord Citrine, to receive a deputation from the London Bonus Committee and to hear the case for reinstating the 7½% bonus payments. We understand that a reply has now been received from the Minister's private secretary. This states:—

The continued payment of a bonus would not need authorisation from the Minister, who has indeed no power to intervene in any way in questions affecting salaries and conditions of service. In accordance with Section 53 of the Electricity Act (1947), these are matters for the Electricity Board to settle by negotiation. In the circumstances, therefore, the Minister regrets that he is unable to receive the deputation suggested.

Brightness Engineering

An Extension of Illuminating Engineering Technique

BEFORE the Illuminating Engineering Society on Tuesday of last week, a paper on "Brightness Engineering" was given by Mr. W. ROBINSON, of E.D.A.

Brightness engineering may be regarded as the extension of illuminating engineering to include the planning of brightness and brightness ratios. It is an attempt not only to plan the illumination on a certain plane, but the brightness distribution of the whole field of view and (assuming that it is based on sound premises) represents design for vision in its widest sense.

It represents a rationalisation of, rather than a breakaway from, existing illuminating practice, and normal methods of glare control, illumination of surroundings and correct colour practice can be regarded as rule-of-thumb brightness engineering.

Three necessary conditions for the acceptance of brightness engineering, said Mr. Robinson, are the general agreement on desirable brightness ratios (i.e. some form of brightness code); the existence of adequate design data; the existence of suitable instruments for brightness measurement in the same way that illumination could be easily measured.

Brightness Ratio

There was general agreement that the control of all interior brightness ratios in relation to the work and source brightnesses was essential for sustained, comfortable vision, and there was a growing tendency to use a 3/1 ratio as a guide. Mr. Robinson discussed the experimental background of this ratio and suggested that the time was ripe for an investigation, under the aegis of the Illuminating Engineering Society, into the establishment of a generalised brightness code. He advanced the view that this investigation would be assisted by adopting a provisional code, such as the 3/1 ratio, as a basis for reference.

He pointed out that brightness design data is now available in the form of inter-reflection tables which enabled the average brightness of the floor, walls and ceilings to be predetermined in a manner similar to the predetermination of illumination from Coefficient of Utilisation Tables.

These tables were based on the use of a "Room Coefficient" which, as with the Lumen Design "Room Index," was a simple function of the room dimensions. All interiors, regardless of size or dimensions, which had the same value of room coefficient had the same inter-reflection characteristics, and it had therefore been possible to provide comprehensive inter-reflection data covering a very wide range of interior sizes and shapes in a compact set of tables. The brightnesses in foot-lamberts of the various room surfaces were given by appropriate tables as a proportion of the average horizontal room illumination, and their pre-determination was quite simple.

Cheap Meter Wanted

The facilities available for the routine measurement of brightness were then briefly reviewed by Mr. Robinson, who expressed the opinion that, though the methods of brightness measurement now were adequate for the purpose of brightness engineering, cheaper and more compact instruments were required and would be developed as brightness engineering gained ground.

There were, however, several brightness meters of the comparison field type which were sufficiently accurate and not difficult to use. The common principle was to employ a comparison field, whose brightness could be adjusted, by means of a lamp, to match the brightness of the test surface which was simultaneously viewed. The illumination of the comparison field could then be measured by using a lightmeter which would also give a reading of the brightness. Filters could be used to enlarge the range of the instrument, and the lightmeter scale readings were then multiplied or divided as required, by the appropriate filter constants.

It would be optimistic to state that brightness meters could now take their place alongside pocket lightmeters; but once their usefulness was recognised there seemed to be every prospect of their becoming available in reasonable sizes and at reasonable prices. There were many viewpoints to be reconciled and many problems still to be solved before brightness engineering took its proper place as a standard component of lighting engineering. The least of these were the technical ones; most were economic, but the greatest problem of all lay in the indifference of the great majority of users of light to their own visual needs.

Progress in Production

Trend towards use of larger diesel-alternators and switchgear evident from examination of 1950 Order books

No. 3. A. Reyrolle & Co. Ltd., and Lancashire Dynamo & Crypto Ltd.

A. Reyrolle and Co., Ltd.

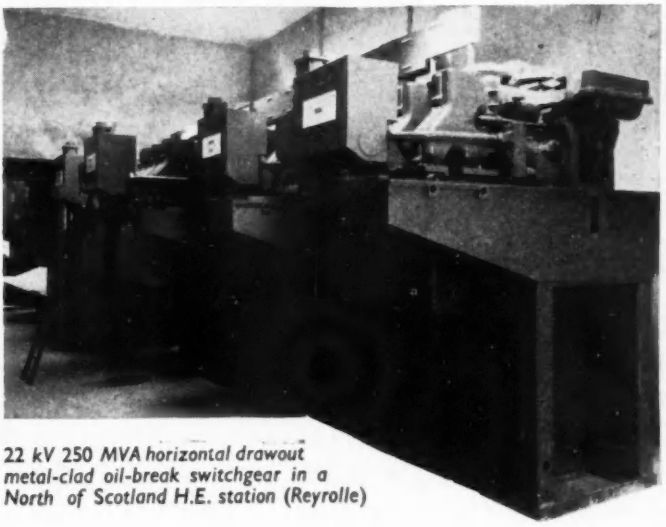
THE demand, both at home and overseas, for the already established standard Reyrolle products was fully maintained during the year, and an ever-increasing number of orders was received for the more recently introduced types of switchgear. In general, the trend has been towards a greater demand for large and high-voltage switchgear, and increased production facilities introduced have amply proved their worth, and have enabled the company to meet its commitments fully.

The flow of orders for initial installations as well as for extensions of existing stations of small oil-volume switchgear for voltages from 33 kV to 132 kV continued to increase, especially in the overseas market, where this type of switchgear has found particular favour. Its suitability for all conditions of service is amply proved by the widely differing climatic conditions of the many countries in which it is installed and operating satisfactorily. These vary from the ice and snow of Scandinavia to the hot sand-laden atmospheres of Israel and Queensland. The production position of the new 66-kV and 132-kV small-oil-volume circuit-breakers with pre-charged spring-operating mechanisms was well advanced during the year, and numbers of these units are now being built. Installation has begun of the first 132-kV indoor small-oil-volume circuit-breakers of this type at a B.E.A. station in Scotland.

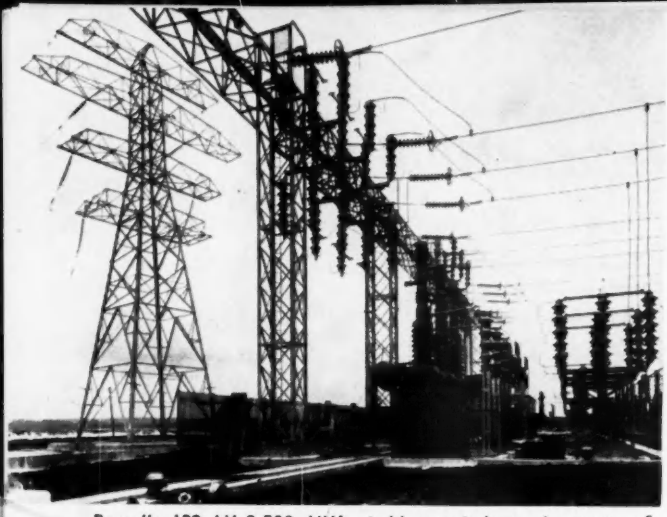
With a view to future requirements, the company has given considerable attention to 275-kV and 380-kV air-blast switchgear, which was the subject of much research and testing throughout the year. Air-blast circuit-breakers rated at 132 kV and 2,500 MVA were installed in an outdoor station in Southern England, and similar circuit-breakers with ratings of 3,500 MVA at 132 kV for a London divisional station are under construction. Following the commissioning of the initial stage of indoor 66-kV air-blast switchgear at a north-eastern power station, a number of additional panels were installed and commissioned, and a further order for similar switchgear was received for a power station in the Yorkshire area, but this gear will be installed on an open site.

33 kV Switchgear

The output of 33-kV 500-MVA single-tank outdoor circuit-breakers attained a new high record, and orders were placed for similar ASTA-certified circuit-breakers of 750-MVA capacity. Orders have been received for some new 33-kV oil-immersed load-breaking isolator switches suitable for building into a ring-main tee-off unit, and designs were developed for an integral unit of this kind incorporating a vertically isolated circuit-breaker. Twenty-two 33-kV 1,500-MVA bulk-oil-volume metal-clad panels were installed in a B.E.A. station in Yorkshire. Designs were also completed during 1950 for a 33-kV 500/750-MVA



22 kV 250 MVA horizontal drawout metal-clad oil-break switchgear in a North of Scotland H.E. station (Reyrolle)

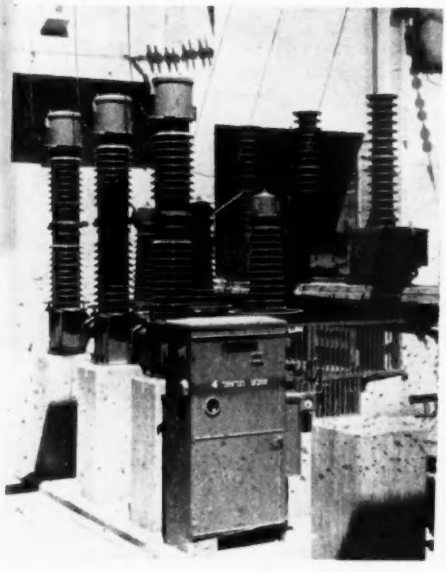


Reyrolle 132 kV 2,500 MVA air-blast switchgear in course of erection at a power station in Southern England

vertically isolated metal-clad switch-panel in accordance with the standard specification agreed jointly between the B.E.A. and the B.E.A.M.A.

Orders for the well-known horizontal-draw-out metal-clad switchgear have increased, particularly from overseas, and amongst them may be mentioned power station equipment for stations in North-western England, Nigeria, Southern Rhodesia, South Africa, Iran and Singapore. Several orders were also placed for this type of switchgear for industrial application, including equipment for cement,

Reyrolle 110 kV 1,000 MVA small-oil-volume circuit-breaker in a power station in Israel



chemical, mining, motor, paper, shipbuilding and steel industries. A particularly large order was also received from the Ministry of Supply for 44 switchboards, each comprising 21 medium-voltage air-break circuit-breakers and contactors. Further large orders were also received from this Ministry and from the Ministry of Works for medium-voltage switch-and-fuse distribution gear, which was also in good demand for industrial application generally. Service experience was also obtained during the year of medium-voltage air-break switchgear controlling power station auxiliaries, and a number of 3·3-kV air-break switchboards for this service have been installed in two British power stations.

During the year a full-scale demonstration of telephase-carrier-current feeder protection was given to many engineers at the works, and this form of protection is now installed in several areas of England and Scotland.

Flameproof Gear

Large quantities of flameproof mining switchgear were ordered by customers in both the dollar and the European markets, as well as in Great Britain, where the introduction of the coal plough method of mining has necessitated the control of multi-motor drives for long scraper-chain conveyors. Control schemes were developed for this, to give comprehensive and collective control of three or four driving-motors. There was also considerable expansion of work in oil refineries, and a special flameproof unit, comprising a pedestal carrying two contactor-circuits mounted above and below a common busbar-chamber, for use in this industry was produced.

The sale of rotary equipment showed a considerable improvement over 1949, there being a marked demand for a.c. variable-speed commutator motors, improvements in the design of which enabled absolutely sparkless commutation to be obtained. Research work also proved the ideal suitability of this kind of motor for driving ships' winches, a field held hitherto almost exclusively by d.c. drives. Business obtained for newspaper press drives was almost double that received in 1949, and included the installation of a drive incorporating electronic control, a method on which considerable development was done during the

year. Trade in welding equipment also showed notable expansion, particularly for single-operator sets.

Lancashire Dynamo and Crypto

A PRONOUNCED demand for the larger sizes of machine is reported from Lancashire Dynamo and Crypto Ltd., the production during 1950 being the greatest yet recorded. Typical of this type of machine is an alternator (for Ruston and Hornsby) supplied to the Bahamas. One of two duplicate diesel-driven open-type alternators, it is continuously rated at 1,495 kW, 0·8 p.f., 400 r.p.m., 6,900 V, 60 c/s, 3-phase.

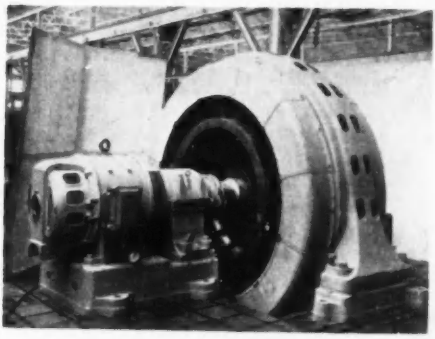
An interesting point about this machine is that it is not provided with a separate flywheel, as the cast steel rotor has been extended to give sufficient momentum to provide the required degree of uniformity in angular velocity. A continuous damper winding is provided in the pole faces to render the alternator suitable for operating in parallel with six other large alternators, all of which L.D.C. have supplied to the Bahamas.

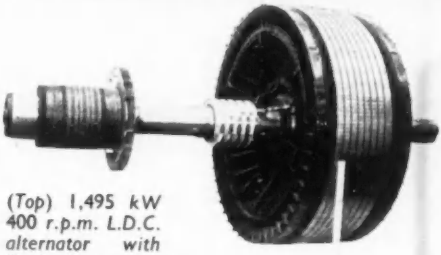
Self-starting synchronous motors, both of the salient pole and cylindrical rotor types, formed a fair proportion of the large machines produced by L.D.C. during the year. Many of these machines have been supplied to Australian Paper Manufacturers Ltd. One of these is of the cylindrical rotor type used to drive a wood grinder, and is continuously rated at 2,000 b.h.p., 250 r.p.m., 3,300 V, 50 c/s. The rotor of this machine is sectionalised and connected to five sliprings in order to reduce the slipring voltage on starting. A photograph of this rotor is shown on the right.

Electronics

The production of "Varionic" equipments for speed control of d.c. motors using grid-controlled mercury arc rectifiers increased in 1950, and the L.D.C. Group extended the use of electronic equipment for control purposes in the industrial field. An example of this was the electric drive of a new pivot hydro-extractor by Watson and Laidlaw Ltd., where the closing of the extractor lid initiates a duty-cycle involving acceleration, constant speed and dynamic braking, the timings of which are pre-set and controlled automatically.

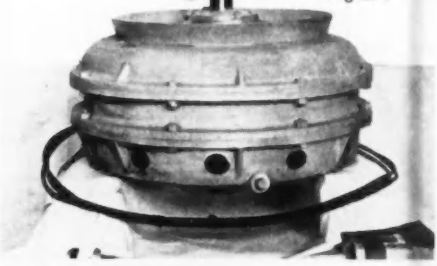
A further feature of interest is that, due to space considerations, the squirrel cage motor driving the extractor has been designed to have a core length of only 2 in. with an outside stator diameter of 23¾ in.





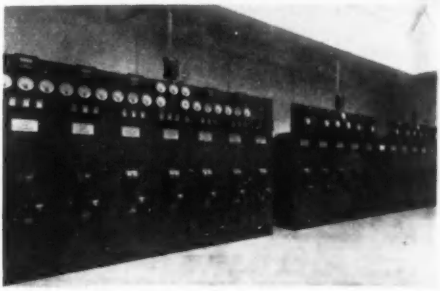
(Top) 1,495 kW 400 r.p.m. L.D.C. alternator with flywheel-armature for the Bahamas

(Above, centre) 2,000 b.h.p. synchronous motor rotor with five slip-rings for easy starting



(Below) Pivot extractor motor with 2 in. core length

(Bottom) Reyrolle 415 V air-break switchgear in a factory in N.E. England



Consumer Survey

Statistical techniques facilitate breakdown of totals

ADVANCED techniques of statistical analysis applied to data collected by the Electrical Research Association in 1946 have yielded some interesting results concerning the domestic load generally, and such topics as space heating, cooking and tariffs in particular. Details of the analysis and the conclusions reached have been issued by the B.E.A. as Utilisation Research Report No. 4, prepared by Messrs. P. Schiller, Dipl.-Ing., M.I.E.E., and W. A. Pridmore, B.Sc.

Cooker Saturation

One of the first facts revealed by the analysis was the relatively high cooker saturation factor found in rural areas, 30% being reached, against 15% and 8% for urban flats and houses respectively. Absence of competition from gas probably accounts for some of this advantage. Saturation figures for water heating, which might be expected to show similarly related figures, in fact give little difference between town and country.

Cookers again figured prominently in the comparison made between credit and pre-payment consumers, which took into account both those on a flat rate and others supplied with a two-part tariff. Appreciable cooker and water heater saturation naturally existed only with the two-part tariff consumers, and for these it was found that the pre-payment consumers had a saturation factor 34% against 16½% for the credit consumers. This is taken to mean that one of the main objects of the combination of two-part tariff and pre-payment meter has been to enable the wage-earner to use an electric cooker.

For all credit consumers the water-heating saturation factor was about 15%, and for pre-payment consumers, about 11%.

Space heating statistics show higher values throughout for credit consumers, the overall ratio being roughly 2 : 1.

Revenue/kWh works out at some 15% higher for prepayment consumers than for credit consumers. Taking both methods of payment into account, consumption averages 200 kWh/consumer for flat rate and 270 kWh/consumer for two-part tariff.

Consumption per Appliance

One particularly interesting use to which the census results were put was the determination of the annual consumption of each type of appliance, given only the annual consumption of each consumer and a list of the appliances that he has installed. The results of this analysis are given in the table. Since the figures are statistical estimates, liable to some margin of error, the more reliable totals are indicated by bold figures.

In conclusion, it is pointed out that the data on which the analysis is based cannot be regarded as fully representative of the full B.E.A. area. The hope is expressed that a new survey will make possible a breakdown for individual Area Boards.

AVERAGE ANNUAL CONSUMPTION/CONSUMER : VALUES/CONSUMER POSSESSING GIVEN APPLIANCE

North and South refer to a line Mersey—Humber

	All Consumers			Urban Consumers			
				Type of Meter		Region	
	Combined	Urban	Rural	Credit	Prepay.	North	South
	kWh	kWh	kWh	kWh	kWh	kWh	kWh
Lighting and miscellaneous ...	**175**	**175**	**175**	**225**	**145**	**180**	**175**
Radio set	**65**	60	40	40	75	55	65
Iron	**50**	60	—	40	65	50	65
Kettle	185	160	260	170	120	125	245
Cooker—							
All categories	**1,400**	**1,380**	**1,360**	**1,360**	**1,610**	**1,330**	**1,410**
No kettle, no sink heater ...	**1,540**	**1,540**	**1,590**	**1,450**	**1,770**	**1,390**	**1,590**
No kettle, with s.h.	1,060	1,020	—	995	1,060	—	1,040
With kettle, no s.h.	**1,420**	**1,430**	**1,320**	**1,420**	**1,640**	**1,360**	**1,470**
With kettle, with s.h.	855	725	585	575	—	655	735
Washboiler...	**450**	**460**	**445**	**365**	**615**	**345**	**535**
Immersion heater	**1,560**	**1,560**	**1,460**	**1,610**	**845**	**1,600**	**1,540**
Sink heater...	**955**	**920**	1,620	**925**	**935**	**860**	**933**
Space heating—All categories ...	**515**	**500**	**580**	**555**	**275**	**415**	**545**
1 kW and below	**145**	**145**	120	**140**	**145**	**105**	**165**
1·1—3 kW	**435**	**425**	**460**	**435**	**400**	**370**	**450**
3·1—5 kW	**975**	**935**	**1,130**	**985**	**635**	**960**	**925**
Over 5 kW...	**2,420**	**2,430**	**2,410**	**2,460**	**1,340**	**2,890**	**2,260**
All consumers in group-av. ...	1,035	1,000	1,325	1,160	650	870	1,070

Problems and Practice

IN ENGINEERING

Slip Measurement

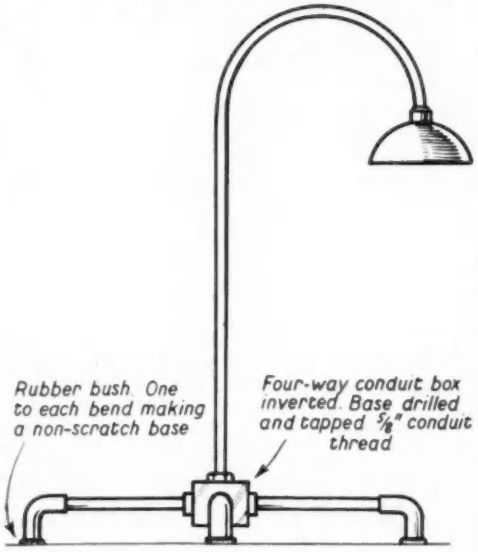
FURTHER to the suggestions on the above subject, there is a simple electronic method of measuring the slip of slip-ring induction motors by means of a cathode-ray oscillograph. Not only can the frequencies of the applied and induced volts be easily measured on the calibrated time scales provided on the Double Beam Cossor Cathode-Ray Oscillographs models 1035 and 1049, but also both the waveforms can be seen for comparative purposes at the same time.—*C. Pinto.*

Portable Floodlights

SIX portable floodlights being required at very short notice, suitable units were built up from stock $\frac{5}{8}$ in. conduit fittings as sketched.

Three-core rubber sheathed flexible was led into the circular conduit box drilled for back entry, and the earthing core, led out via a small hole drilled through the box lid, clamped under one of the screws securing the lid. The two feed cores terminated in a twin porcelain sheathed connector, and were extended in the form of twin rubber sheathed flexible feeding directly into the lampholder.—*R. S.*

Details of conduit assembly for improvised floodlight


Rubber bush. One to each bend making a non-scratch base
Four-way conduit box inverted. Base drilled and tapped 5/8" conduit thread

Residual Magnetism

SOME months ago we installed an electrode boiler which, for tariff purposes, was arranged for night load. The control is by thermostats in circuit with the operating coil of a triple pole contactor located adjacent to the boiler. A master "safety" thermostat is fitted and arranged to trip out the main circuit breaker in the event of gross overheating due to failure of the normal controls.

On various occasions the boiler closed down during the course of the night, but upon daytime inspection no fault could be traced.

The fault was ultimately proved to be in the control contactor which, on occasion, due to residual magnetism held in after the control circuit was broken. The boiler then overheated; tripped out the main circuit breaker which closed the boiler down. During the course of the night the control contactor lost its residual magnetism and fell off, leaving no clue to the fault.

The difficulty was overcome by fitting a high resistance and connecting it so that the contactor operating coil had a low demagnetising current applied to it when in the off position, instead of being open circuited as when supplied by the makers.—*T. A. P.*

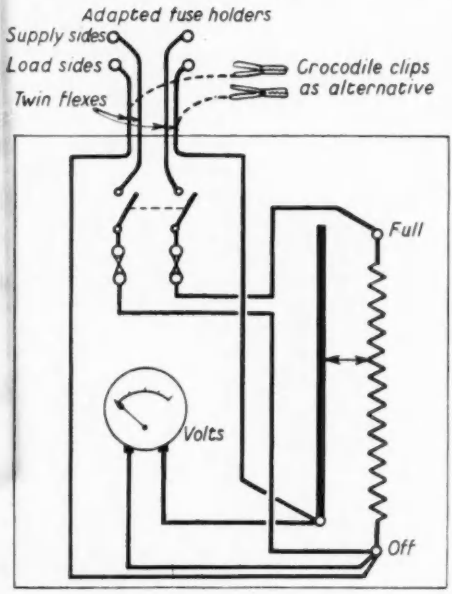
Unbalanced Voltages

LATE one afternoon a consumer phoned to say that one of two identical 400 V, 3-phase a.c. stator/rotor contactor panels had been behaving rather queerly and had had to be shut down. The contactor coils were wound for 230 V a.c. supply. No. 1 panel was operating in a normal manner, the ammeter on the panel showing approximately 55 amps. On closing the hand switch for No. 2 panel the stator contactor closed but immediately opened; this sequence of events continuing more or less to repeat itself. After all connections for the coil circuit had been checked and examined and found in order it was suggested that some mechanical derangement of the contactor might have taken place and required adjustment, but the firm's own electrician said he had already checked up on this possibility and was satisfied everything was in order. A quick re-check proved this to be correct. The coil was then checked for continuity and

found o.k. An open-circuit voltage test was then taken at the coil terminals and found to be 185 V, which dropped to 180 V and less when the contactor was closed by hand. Here, then, was the cause of the trouble—low voltage between blue phase and neutral, but why did No. 1 panel operate normally? Further examination disclosed the fact that the coil circuit of No. 1 panel was connected between red phase and neutral, the voltage between which was approximately 220 V. As slight intermittent trouble had been previously experienced it was decided to reconnect No. 2 panel contactor coil between the red phase and neutral. Since that time no further trouble of a similar nature has been experienced.—*A. Robbins.*

Relay and Contactor Testing

TO ensure the reliable operation of voltage relays and contactors in industrial control equipments is one of the aims of an industrial maintenance department. In this connection it is useful for the operational testing of such equipments, which follows routine maintenance, to incorporate tests which determine



Relay test set connections

the "pickup" and "dropaway" voltages of contactors and voltage relays with a view to their adjustment for correct operation if test results are unsatisfactory. Test limits (such as "contactors should close at 2/3 normal voltage") should be decided in advance by the maintenance authority.

Should a large number of somewhat similar control equipments require testing in this way a test set of the form to be described is suggested, a set which is particularly suited to 200/250-volt d.c. or a.c. equipments with operating coil currents of under half an ampere, and with local control fuses.

The test set, mounted on a board as shown in the accompanying sketch, consists of a resistor, of about 100 ohms and capable of carrying about 3 amperes, used as a potential divider. For safety it is supplied through a pair of 5-amp. fuses and a double-pole switch; these may conveniently be incorporated in a small switch-fuse unit. For convenience of use the set is supplied from the control supply of the unit to be tested, via two adapted fuse holders. These are adapted by removal of the fuse or fuse wire and connection of one wire of some twin flex to each of the erstwhile fuse connections. Further adaptation (as possibly boring a hole in the back of certain ebonite-type fuse holders) may also be necessary.

The wires from the supply sides of the fuses (which sides should be indelibly marked) are taken to supply the potential divider. The other two wires, which feed the contactor or relay equipment, and are taken to the load sides of the fuses, are connected to the potential divider output. To this output is also connected an a.c./d.c. voltmeter, of multi-range type if desired.

To use the test set (as on a contactor starter from which the motor has been isolated) the adapted fuse holders of the test set are substituted for the control fuses of the equipment. The control switch is then held closed and the potential divider setting increased until the contactor closes; the voltage at which this occurs may be read from the voltmeter.

The versatility of this set may be further increased by substituting crocodile clips for the load-side fuse connections, as shown in the dotted lines on the sketch. These clips may be placed directly across the terminals of the relevant coil and its operating voltage thus checked directly (the complete equipment being later tested as if in service). This increased versatility does, however, entail the routine testing staff being more closely acquainted with the differences between the many equipments on which they may work than if the first-mentioned form of the set (possibly only directly applicable to a limited range of equipments) be used.—*B. J. P.*

Impulse Generators

Design and Development Discussed at I.E.E.

VOLTAGE surges of considerable magnitude inevitably occur on any large network, and it has become of importance to know the behaviour, under these conditions, of associated equipment such as insulators, transformers, cables and the like.

In consequence, specifications now frequently include requirements for impulse voltage tests, the required voltage being obtained from a multi-stage generator. The design and development of these generators has thus become of importance to the manufacturing side of the industry (as apart from the research), and unfortunately the literature available dealing with this subject is scattered through a large number of technical and scientific papers and journals. This situation is, however, largely cleared up by the integrating paper, "The Development and Design of High-Voltage Impulse Generators," read at the I.E.E. last Thursday and written by Messrs. F. S. EDWARDS, A. S. HUSBANDS and F. R. PERRY.

Waveshape

The paper began by defining the various waveforms in use. Most waves had similar shapes, although there were differences in the timing of the waves laid down in various specifications. In Britain, B.S.923:1940 gave the standard wave as a one-fiftieth microsec one, which was also recommended by the International Electrotechnical Commission and the Verband Deutscher Elektrotechniker. B.S.923 also prescribes the methods of measurement of the wave. Referring to Fig. 1

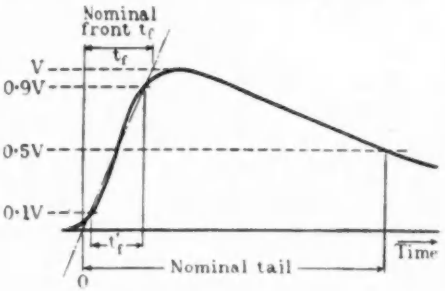


Fig. 1. Diagram showing nomenclature of wave shape

the "nominal" wavefront duration t_f is defined as being 1.25 t^1_f, where t^1_f is the time interval between the points where the voltage attains 10% and 90% of its peak value on the rising wavefront. This assumed that the wavefront has a uniform voltage gradient. The one-fiftieth wave was thus defined as that wave where the time of the voltage rising to its peak (t_f) was one microsec and the time for it to fall to one-half of its peak value (starting at the beginning of the wave) was 50 microsecs.

The paper continued by giving a theoretical analysis of the single-stage circuit showing the simplifications necessary to handle the mathematics reasonably.

Development

In the section on development it was shown that although Marx solved the fundamental problem of producing a circuit in which the individual components were not operated at a voltage of more than a small fraction of the operating voltage, his early circuits did not keep the load earthed during the charging

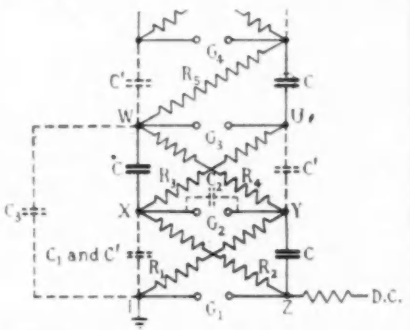


Fig. 2. Three stages of an impulse generator showing the distributed capacitances (dotted)

period. Many voltage doubling and multi-stage circuits were described showing the gradual development up to the present day, and the effects of the wavefront control and wavetail control resistances were discussed. Doubt was cast on the validity of the classical theory generally assumed to account for the rapid successive breakdown of the sphere gaps, the authors advancing the opinion that the

phenomenon was due to the distributed stray capacitances (shown in Fig. 2). Although this theory went a long way to explaining the practical operation, they pointed out that it did not account for the extremely erratic behaviour of some generators when the resistances had been made small to obtain a short-tailed wave.

The paper also included details of the effect of dust and illumination on the regularity of breakdown of gaps, and emphasised the importance of the spark illumination from the first gap on the breakdown of the remainder. Descriptions of some modern types of generator and the essential auxiliary equipment, together with some examples of measuring and testing techniques, were also given.

DISCUSSION

MR. R. DAVIS (N.P.L.) said that buyers of electrical equipment were becoming very surge-conscious, and many transformer manufacturers were having to install surge generator equipment. Generators of about 1,000 kV should cover 90% of their work, but he felt that the time had come to consider whether there should not be somewhere in this country, possibly at the N.P.L., a high-voltage surge generator capable of dealing with exceptional cases.

DR. L. G. BRAZIER (B.I. Callenders Cables) said that a single-stage capacitor charged to a high voltage should make a very fine surge generator.

In 1923 there were no good methods of producing rectified high-voltage direct current, but since then enormous developments had taken place.

DR. K. KONSTANTINOWSKY, in a communication read in his absence by MR. J. K. WEBB, stated that the impulse testing of cables and accessories was assuming an importance at least equal to that of the 50 c/s high-voltage routine test. Most of the world's impulse generators did not appear capable of testing cable lengths of more than 30 yards, but there were some generators which could test complete manufacturing lengths. In these cases high-voltage cable was used as the generator capacitance, and so much higher charging voltages could be used. Selenium rectifiers could be employed; his firm had already made such a rectifier of 400 kV, and were confident that they could design one for 1,000 kV.

MR. J. L. ROBINSON (Ferranti), referring to the initiation of the discharge of the impulse generator, said that in most cases the moment of initiation was under control, and the great disadvantage of provision for uncontrolled operation was the provision of a delaying cable between the potentiometer and oscillograph, which was a severe drawback with the capacitance potentiometer in particular.

MR. D. F. OAKSHOTT (B.E.A.) mentioned the so-called cable-drum generator, where the capacitors were formed of drummed-up high-voltage cable. It had the advantage of firing through very readily, the stray capacity to earth of each condenser being high. A drum 8 or 9 feet in diameter and about 2 feet deep might have a self-capacitance of the order of 200 $\mu\mu$F, which was very much more than for a conventional generator.

MR. E. T. NORRIS (Ferranti) thought that the testing of cables with high-voltage continuous direct current, would probably increase, and there should be scope for the combination of the two types of apparatus which might seriously influence the design of surge generator circuits so far as the Marx principle was concerned. In the practical construction of surge generators different characteristics were required depending on the class of apparatus being tested.

MR. H. M. LACEY (E.R.A.) thought that in time the impulse test for certain apparatus would entirely supersede the 50 c/s test. Any overvoltage test imposed some risk of damage to the equipment being tested, and means might be devised for determining the probable life of apparatus without appreciably exceeding its normal voltage. He had in mind the method known as measuring the initial discharge voltage, which could already be applied to certain types of apparatus and might be adapted to others.

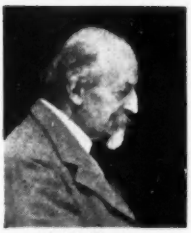
In connection with the initiation of generator discharges, a method which had many advantages was of the 3-electrode type, where the main gap was between discs with rounded edges and the auxiliary electrode was introduced through a hole in the centre of one of those electrodes and consisted of a thin rod.

MR. T. R. P. HARRISON (W. T. Henleys Telegraph Works), from the point of view of cable testing, said that it was rarely possible to get the 1/50 microsec wave demanded by B.S.923. For four or five years they had been asking for the amendment of that specification, and he hoped they would eventually obtain it.

MR. F. W. TAYLOR said that when it was decided to include the wavetail control resistance and part of the wavefront control resistance within the confines of the generator, a wire-wound type was developed which was very simple and had proved satisfactory. It could be designed to meet any desired arrangement of condensers and any desired value of resistance, heat capacity or length, simply by changing the size of conductor, and with suitable end-caps flashover values of well over 10 kV/in. could be obtained.

MR. W. G. HAWLEY said that the column type of generator saved floor-space, but something should be done to save height, because it was the height of buildings that caused trouble. He had figures relating to a number of generators in different parts of the world which, if brought down to a basis of 1,000,000 kV, ranged from 8½ ft per 1,000 kV for a Swedish generator up to 13 ft per 1,000 kV.

MR. H. BOLDINGH, DR. P. HAMMARLUND and Mr. A. C. SIM also took part in the discussion, to which MR. F. S. EDWARDS replied.



A. P. Trotter

PIONEERS OF ILLUMINATION

The First Trotter-Paterson Memorial Lecture

Sir Clifford Paterson

APPROPRIATELY enough, the first Trotter-Paterson Memorial lecture, delivered by DR. J. W. T. WALSH, M.A., D.SC., F.I.E.S., dealt with the early years of illuminating engineering in Great Britain. Equally appropriately, emphasis was laid on the part played by Trotter and Paterson themselves, who between them span some half a century of progress.

Although the very first book on illumination was that written by Benjamin Thompson, Count Rumford, the illuminating engineering movement may be said to have started with Trotter's classic paper "The Distribution and Management of Illumination," read before the Institution of Civil Engineers in 1892. Trotter, however, had been interested in illumination at a considerably earlier date, having designed a dioptric system for obtaining a uniform distribution from an arc lamp in the early 1880's, and assisted Sir William Preece in 1883-4 to make the first measurements of illumination (as such) ever made, using a grease-spot photometer, in which illumination was measured in terms of the current taken by the standard—a 2½ c.p. Swan lamp. The portability of this simple photometer must, however, have been adversely affected by the measuring device, which, due to the insensitivity of contemporary ammeters involved a Cardew differential galvanometer, two sets of plug boxes and two large Leclanché cells.

Slow Beginnings

Interest in illuminating engineering was aroused only slowly, and even as late as 1902 recommendations for domestic lighting were in terms of the lamps to be provided. Leon Gaster did yeoman work with his paper "The Province of the Illuminating Engineer" in 1907 and the foundation, in 1908, of the journal now known as *Light and Lighting* which was then known as "The Illuminating Engineer" and was later adopted as the official organ of the Illuminating Engineering Society on its formation a year later. The first volumes of this publication contain many names of pioneers including, in addition to Trotter and Gaster, Paterson, Dow, Clinton, Edgcumbe, J. A. Fleming, Haydn T. Harrison, MacGregor, Morris, and P. J. Waldram.

The I.E.S., of which Prof. Sylvanus P. Thomson was the first President, was founded in 1909 and, right from the first, it was made clear that it was intended to be a society of those interested in illuminating engineering and not an association of illuminating engineers since, as Gaster pointed out, the illuminating engineer was a creation of the future and an attempt to anticipate him in name only could only bring the title into disrepute.

The period 1909-1914 was a busy one for the Society and intensive study was made of glare problems and of street lighting, the first draft specification for street lighting appearing in 1913. A most important advance was the setting-up of a Departmental Committee by the Home Secretary, in 1912, to report on the question of factory lighting. C. C. Paterson, then at the N.P.L., was one of the secretaries while Dr. Walsh himself was in charge of the survey made in 1913, which involved several thousand measurements in some 57 factories in the engineering, textile, and clothing industries. The report, published in 1915, and occupying three volumes, makes interesting reading nowadays, some of the intensities, as low as 0·1 l./s.f., being almost incredible to modern ideas.

Trotter became president of the I.E.S. in 1917 and held the office till 1920, when he retired and left Paterson as the acknowledged leader of the illuminating engineering world, a position he occupied by virtue of a number of achievements. He had built up the photometric section of the N.P.L. during 15 years of pioneer work on photometric standards, and was then building up a vast industrial research organisation, was chairman of the B.S.I. committee on electric lamps and had been honorary secretary of the International Commission on Illumination ever since its formation in 1913—a position he was to occupy, with only one break, until its last meeting in 1948.

overseas news

Bartica Acquisition

Following an indication by Booker Brothers McConnell and Co., Ltd., to withdraw as electricity supply undertakers to the village of Bartica, British Guiana, the company has offered the electricity works, site, buildings, etc., to the local council for the sum of $40,000. Having inspected the plant, Major Hargreave, late of the New Amsterdam Electricity Works, has reported to the Council that the equipment is worth the price asked, but it is not suitable for a reliable service within Bartica, and at least one and possibly two new generating sets will be needed to provide an adequate supply. To this the Village Council has agreed, and an approach has been made to the Government for a grant of half of the $80,000 needed to acquire the undertaking and purchase new plant. It is also suggested that a Board of Control be formed to be responsible for the management of the undertaking under a new enabling Ordinance in Council.

A Problem

The New Amsterdam Town Council, British Guiana, is still losing about $15,000 per annum on its electricity works—operated as a separate unit from the water works—but the Town Fathers are hoping that with definite plans now being made, it should pay its way next year. For some time the old electricity works has been a drain on the Council, we understand, and only the profitable water works helps to balance the Council's budget.

Boilers for Queensland

Additional boiler plant is to be obtained for the Townsville, Capricornia and Wide Bay Regional Electricity Boards, Queensland, at a cost of £1,100,000. The equipment is to meet greatly increased electricity demands expected in future years, Mr. Power, Mines Minister, stated a few days ago. Following the State Electricity Commission's recommendation, the contract for the plant will be given to Babcock and Wilcox Pty., Ltd. It will include six 100,000 lb per hour boilers, two of which will be installed at each of the new generating stations being built at Townsville, Rockhampton and Howard. The plant will incorporate spreader stoker equipment. This will handle the greatest variety of coal and ensure efficient operation of stations under varying fuel conditions. It will be necessary for the additional boilers to be installed progressively between 1954 and 1956.

Tasmania's Progress

Future progress in Tasmania largely depended on producing electric power at an economic price, the Premier, Mr. Cosgrove, said recently when speaking at an informal luncheon at which he met field engineers associated with the £7,000,000 Nive power development scheme. Mr. Cosgrove said he was proud of the Hydro-Electric Commission of Tasmania and the work it had done in the development of hydro-electric resources. Earlier, he had inspected the new tunnel for the proposed Tungatmah power station.

The Premier's visit to the Clark Dam at Butlers Gorge coincided with a slight overnight rise in the level of the huge lake formed behind the dam. The level of the water was 150 ft, but another 45 ft is needed before the water storage pond is full. The Premier inspected the new power house under construction at the base of the dam. The difficult stage has been reached with the work on the power house, and installation has started on the new turbine unit which will generate an additional 17,000 h.p.

S. Australia Report

Fuel costs of the Electricity Trust of South Australia were £1,143,514 during the twelve months to June 30—an increase of £254,703, or 28·7%. Supplies of N.S.W. coal were insufficient to meet the needs of the State, and a further 62,072 tons were imported from South Africa, it is stated in the annual report just to hand. A total of nearly 439 million units were generated by Osborne "A" and "B" stations, and a further seven million by the country power stations. Industrial consumers took 157·8 million units, commercial 52·5 million and residential 146 million. At June 30 last the consumers totalled 144,496, of which 124,498 were residential. The demand for all types of hire appliances has continued, and during the year under review 4,513 cookers, 3,553 sink water heaters, 1,867 wash boilers and 1,879 bath heaters were installed. The work on extending Osborne "B" power house is proceeding steadily, accommodation having been made for the first three 150 klb/hr boilers, and similar preparations for two more boilers and No. 4 turbo-alternator. Work on the Port Augusta station is also advancing. Following acquisition of the Port Lincoln undertaking, it has been decided to install two more diesel sets of 300 kW and 200 kW at the site of a proposed steam station. The diesel plant will act as standby when the steam station is commissioned.

Flood Prevention

We have already told something of the desperate efforts of scores of men, and the use of sandbags and other materials costing nearly $200,000, to save Winnipeg Hydro's main power terminal during the devastating floods of 1950. Now Winnipeg is spending

$300,000 on a steel and concrete rampart to ensure protection for its Rover Avenue distribution station even if flood waters reach 36 ft above datum, 6 ft higher than last spring's peak. Crews of men have been working since early in November driving steel sheets into the frozen ground encircling the station. A 10 ft high concrete wall is also to be constructed.

Swiss Power Plan

Plans have been approved for the construction of a large reservoir and power station in the Wallis Canton of Switzerland, to improve the country's supply of power during the winter season. Contrary to the opinion expressed last summer, power supply and demand have failed to reach equilibrium this winter. To ease matters efforts are now being made on various sides to intensify construction work on new power stations. Of special importance is a decision by the Electricity Company "S.A. Grande Dixence" to start work on the first phase of its plan for the "Grande Dixence" works in Canton Wallis. This project will have a masonry dam 250 metres high and contain a number of stations capable of producing during the winter season 1,400 million kWh. "Summer power" will be produced for the first time in 1952, while production of power during the winter months will start in 1955. "Grande Dixence" will be of unusual size. Excavation of the foundation for the dam will involve the removal of 750,000 cubic metres. The project has been divided into 14 stages, of which only one will be tackled in the first instance. Some 16 large power stations are under construction in Switzerland at the present time, while concessions have been obtained and finance assured for the building of a further eight. By 1955, Switzerland's productive capacity is likely to rise to 13,000 million kWh, from 10,000 million at the present time.

State Development

Progressive schemes for electrification of the entire rural areas of Uttar Pradesh and consequent development of industries in the villages based on electric power, have been finalised by the State Government for this purpose. The State has been divided into five zones, the largest one covering western districts where power will be supplied by the Ganga Grid through this project. It is expected to generate nearly 87,000 kW.

Goods for Pakistan

Import trade control by the Pakistan Government has recently been amended in that the open general licence X has been superseded by licence XI, as a result of which many goods have been removed from the open general licence. Among such goods are conduit, plain and coloured filament lamp bulbs, ceiling fans, electrical accessories such as switches, plugs, etc., and domestic refrigerators.

India's Restriction

In the revised Indian Import Regulations governing the issue of licences for the year 1951, it is noted that no licenses will be granted for the import of hairdryers, desk lamps, electric cooking devices, water heaters, immersion heaters, fires or room heaters, heating elements, sterilisers, irons, clocks, vulcanisers and cable testing equipment. On the other hand imports of incandescent lamps of the lantern type of above 400 c.p. will be allowed on the basis of 25% of the best year's imports of all types of incandescent lamps.

Loan Wanted

Brandfort municipal ratepayers, Orange Free State, will be asked, at a meeting to be held in the Brandfort Town Hall on Thursday next, January 25, 8 p.m., to approve the raising of a loan of £25,000 for the erection of a power line from Brandfort to Glen, to enable the Town Council to purchase electricity from Bloemfontein. The proposed loan also covers the cost of transformers, substations and other material required for the scheme.

Import Licensing

In the recent changes in the New Zealand Import Licensing Schedule, many items are now entirely freed from import control when obtained from soft currency countries. These goods include generators, convertors, rectifiers, motors (excluding all types of 3-phase from 1 to 5 h.p.), transformers for radio sets, battery chargers, switchboards, fuseboards, shunt or voltage regulators, motor starters and controllers, rheostats, resistances, condensers, relays, electro-magnets, switches, circuit breakers, cut-outs, lightning arresters, wallplugs, plugs and sockets, cord connectors, through cord switches, condensers, ballasts, chokes, electric razors, hotplates for coffee brewers, various appliances, food mixers, lampshades, telegraphy and telephony apparatus, wire, cables, and winding wires (except plastic or rubber-covered).

Reorganisation

The Japanese Government, on instructions from G.H.Q., is reorganising the electric power industry by "Potsdam Ordinance," ordinary legislation to this end having been held up by considerable political controversy in the Diet.

Output of public power supply stations in Japan during October last amounted to 3,398 million kWh, compared with 2,991 millions in September, and a monthly average for 1949 of 3,001 million kWh.

Persia Imports

A wide list of goods hitherto subject to quota restrictions may now be freely imported into Persia. Among the goods listed are: electric shades and lamps, flashlamps, electrical appliances, battery cells, wiring equipment and cables, h.t. insulators, electro-medical apparatus, and certain types of telegraph and television equipment.

PERSONALITIES

IN THE INDUSTRY

It is announced that **Mr. C. A. Clench,** M.I.Mech.E., M.Inst.F., has been appointed chief generation engineer (construction), of the London Division of the B.E.A. Since April, 1948, Mr. Clench has been largely responsible for the London Division's construction programme for the new Bankside and Deptford East stations and the Woolwich extensions. His early engineering training on power station work was obtained with the British Thomson Houston Co., Ltd., at Rugby. He joined the London Power Co., in 1927, and until vesting day was a senior constructional engineer with that company.

Mr. C. A. Clench

The Ulster Minister of Commerce has constituted the Electricity Board for Northern Ireland by reappointing for a further two years, ending December 31, 1952, the existing members, namely: **Sir William Robinson,** J.P.; **Major Charles Alexander,** M.C., D.L., J.P.; **Mr. A. G. Algeo,** C.B.E., J.P.; **Mr. W. A. Mullen,** D.L.; **Mr. A. Shiells,** and **Mr. J. Walker,** F.C.A. Sir William Robinson is again chairman.

The end of last month saw the retirement of **Mr. C. H. Kernot,** M.I.E.Aust., chief engineer of the State Electricity Commission of Victoria, Australia, with which he had served for 30 years in senior engineering positions. He was construction engineer at Yallourn for five years during which the power station and briquette factory were built. Later he played a prominent part in the construction of the Sugarloaf-Rubicon hydro-electric scheme, and, in more recent years, the Kiewa hydro-electric project. Mr. Kernot will continue to act in a consultative capacity for the Commission.

Previously district manager at Cleckheaton, Yorkshire Electricity Board, **Mr. Norman Ashton,** A.M.I.E.E., has been appointed by the Board to a similar post at Halifax. Prior to nationalisation he was chief engineer and manager of the Spenborough U.D.C. undertaking.

The Minister of Fuel and Power has appointed **Mr. E. H. Hickery,** B.A., as a part-time member of the South Wales Electricity Board in place of **Councillor I. R. Thomas** who resigned.

Sir Archibald McKinstry has retired from the board of Babcock and Wilcox Ltd. as he wishes to reduce his business activities.

Chief technical engineer of the British Thomson-Houston Export Co., Ltd. since July, 1949, **Mr. R. L. Chantrill,** B.Sc., M.I.E.E., M.Amer.I.E.E., has been elected a director of that company. He gained early experience with Vickers Ltd. before joining the B.T.H. Switchgear Engineering Department in August, 1924, and from August, 1929, until May, 1932, he was on loan to the Government of the Punjab. From then until July, 1949, he was on the engineering staff of A.E.I. (India) Ltd. except for a short period with the Hydro-electric Department of the Government of the North-west Frontier Province as technical adviser on the design of the Malakand water power project. He was appointed chief engineer and elected a director of A.E.I. (India) Ltd. in 1942, taking charge of the Engineering Department, and being concerned in numerous power development schemes. Since becoming chief technical engineer of the B.T.H. Export Co., Ltd., Mr. Chantrill has toured Norway, Sweden, Finland, Australia, New Zealand, Canada and the U.S.A. on the company's business.

Mr. R. L. Chantrill

The Earl of Verulam, M.A., F.I.I.A., J.P., chairman and managing director of Enfield Cables Ltd. and chairman of Enfield Rolling Mills Ltd. has accepted an invitation to become an additional patron of the Purchasing Officers' Association.

The Mond Nickel Fellowships Committee has announced that awards for 1950 have been made to **Mr. D. Alexander,** University of Otago, New Zealand, **Mr. F. R. H. Allon,** of John I. Thornycroft and Co., Ltd., **Mr. K. W. J. Bowen** at Cambridge University, **Mr. M. G. Gemmill,** with United Steel Companies, Ltd., and **Mr. W. B. Hall,** Nchanga Consolidated Copper Mines, Ltd., Northern Rhodesia.

Formerly with the South East Scotland Electricity Board, **Mr. R. H. Wallace** has been appointed Scottish representative for Landis and Gyr Ltd. Educated at Daniel Stewart College, Edinburgh, and at the Heriot Watt College, he was trained in the Distribution Department of the Lothians Power Co., and after several years of outside experience as district engineer and sub-station engineer was ultimately appointed meter superintendent. R. H., by the way, is the son of Mr. J. F. Wallace, general secretary of the Electrical Power Engineers' Association.

Following the retirement, at the end of last month, of **Mr. J. G. Lowe,** F.C.W.A., comptroller and secretary of Metropolitan-Vickers Electrical Co. Ltd., **Mr. E. Salmon** has been appointed comptroller, and **Mr. D. Thomson** secretary. In addition, **Mr. W. D. Taylor** has been nominated to succeed Mr. Lowe as secretary of the Metropolitan-Vickers Electrical Export Co. Ltd. Mr. J. G. Lowe has been in the company's service for over 45 years. He became assistant secretary in 1920, treasurer in 1925, and assistant comptroller in 1928. In 1937 he was appointed comptroller in succession to Mr. E. H. W. Cooke. On the retirement of Mr. R. H. Haviland in 1946, Mr. Lowe became secretary—both of Metropolitan-Vickers Electrical Co. Ltd., and of Metropolitan-Vickers Electrical Export Co. Ltd. He was appointed a member of the first management committee formed in 1920. Mr. E. Salmon joined the old British Westinghouse Co. in 1915. He became assistant accountant in 1926, accountant in 1937 and chief accountant in 1946, and has served for many years on the M-V Staff Council. Mr. D. Thomson, now secretary, has been with the company's accounting department since 1918, becoming chief clerk in 1937, internal auditor in 1942 and assistant secretary in 1946. Mr. W. D. Taylor joined the company's London office in 1916, being appointed London cashier in 1935. From 1924 to 1946 he also assisted the late Mr. R. H. Haviland, secretary of the company, and last year he was appointed secretary of Metropolitan-Vickers—GRS Ltd. Mr. Taylor is honorary treasurer of the ex-British Westinghouse Association and also of the Electrical Industries Benevolent Fund Golfing Championship.

Further appointments made by the Metropolitan-Vickers Electrical Co. Ltd., are that of **Mr. E. Tankard** as chief accountant and **Mr. A. Cooper** as assistant accountant. Mr. Tankard has served with the company since April, 1913. He became internal auditor in 1939, and in 1942 assistant accountant. For a period during 1930-32 he was transferred to Uruguay, where he acted as the company's site accountant on the Montevideo power station contract. Mr. Cooper joined the firm's accounting department in 1937, and became branch accountant at the Risley sintered carbide factory in 1943. In 1946 he returned to the Trafford Park Works as internal auditor.

A recent change of appointment announced by E. K. Cole Ltd., concerns **Mr. R. K. Spencer,** who now becomes assistant chief engineer. The position is one which has not been filled for some time and Mr. Spencer has, in fact, been acting partially in this capacity, in addition to his better-known work on quality control. The Quality Control Section of the Development and Engineering Dept., has become one of the "showpieces" of the Ekco factory, and Mr. Spencer recently visited the National-Ekco factory at Bombay in connection with this aspect of his work.

Mr. R. K. Spencer

District consumers' engineer, South-west Fylde district of the North Western Electricity Board, **Mr. J. C. Fairchild** is to retire at the end of this month. Prior to nationalisation he was borough electrical engineer and manager at Lytham St. Annes, where he had served for nearly 40 years. For many years his duties also included management of the tramways system, but this he relinquished in 1946.

Mr. Frank V. Brook, vice-chairman and managing director of Brook Motors Ltd., recently returned from a business trip to the Middle East, India, Malaya, Australia and New Zealand, where he contacted the firm's representatives. He found enthusiasm for the company's products extremely high, and in Australia and New Zealand, particularly, prospects for increased trading most encouraging. The outward journey was made by air and the return by sea. Mr. Brook was accompanied by his wife.

Mr. Frank Gowdridge, who joined the Leicestershire and Warwickshire Electric Power Co. in 1926 and was appointed district engineer in 1938, and subsequently became district engineer for the Kibworth (Leics.) district of the East Midlands Electricity Board, has been appointed district manager for the Coalville district. Before leaving Kibworth he was presented with a gold inscribed cigarette casket, subscribed for by the staff.

Mr. J. G. Lowe

Mr. E. Salmon

Mr. D. Thomson

Mr. E. Tankard

We learn of the recent retirement of **Mr. R. H. Bartley,** M.I.E.E., M.I.Mech.E., M.N.Z.I.E., M.I.A.O., from the position of general manager of the Auckland Electric Power Board, New Zealand, which he has held for the past 25 years. Born in Auckland, he came to Britain, studying at Birmingham University, and serving for five years as a premium pupil with Crompton and Co. at Chelmsford. Afterwards he spent some time with the Northmet Co., and later with Coventry Corporation Electricity Department as construction engineer and as assistant engineer. Returning to New Zealand in 1913, he joined the New Plymouth County Council and eventually became engineer and manager of their electric supply and tramways undertaking. He joined the Auckland E. P. Board in May, 1923, as assistant engineer, later becoming chief engineer, and, in September, 1925, general manager.

The Edison Swan Electric Co. Ltd., announces with regret the retirement, due to ill-health, of **Mr. Tom Hands**, director of manufacture. Mr. Hands has a record of 44 years' service with the A.E.I. group of companies.

Nominated works manager of the Cambuslang factory of Hoover (Electric Motors) Ltd., is **Mr. C. T. Hodges,** who will be deputy to Mr. T. E. Groutage, director and general works manager. Mr. Hodges gained his early electrical training in Portsmouth, where he worked for some years. Later he held supervisory and managerial positions at Ilford, Hendon and Brentford. He joined Hoover Ltd., as assistant chief inspector in 1943, and was made chief inspector at the end of the war. Latterly he has taken part in technical missions on behalf of the company to Switzerland, Sweden, Canada and the U.S.A.

Dr. O. H. Wansbrough-Jones, C.B., O.B.E., has been appointed principal director of scientific research (defence) at the Ministry of Supply. He has relinquished his post of scientific advisor to the Army Council.

In succession to Sir William Christie, who has resigned, **Brig. J. V. Topham** has been appointed secretary of the British Engineers' Association.

Mr. William Herod, president of the International General Electric Company, has been appointed as co-ordinator of the Atlantic Defence Production Board.

OBITUARY

The death occurred on January 4 of **Mr. H. W. C. Liddiard,** aged 55, who had been a member of the Industrial Engineering Department of the British Thomson-Houston Co., since July, 1921. He had devoted most of his time to mining problems, particularly those associated with the design of electric winders—he initiated many developments, including improved dynamic braking systems and the application of the commutator type slip-regulator to Ilgner sets. Latterly he had spent much time and energy on the solution of power system and other technical problems taking an active part in the project which resulted in the establishment of the A.E.I. network analyser now installed at Willesden.

We learn of the recent death of **Mr. A. P. Biggin,** who, for a number of years, was consumers' engineer with the Chesterfield Corporation Electricity Department.

We regret to record the death on December 22, of **Mr. H. Fildes,** aged 64, who joined the Hotpoint Electric Appliance Co., in 1936, as sales manager in the Northern Area organisation and continued in that capacity up to 1940, when the growing armament programme drastically curtailed the company's domestic activities. Except for a short break of three and a half years, Mr. Fildes had spent the whole of his business life with one or other of the A.E.I. group of companies, having joined the group as an apprentice to the then British Westinghouse Co., Ltd., in September, 1902.

A director of Tenaplas Ltd. and a number of other concerns, **Mr. J. H. C. E. Howeson** died on January 8, aged 65.

We note the death, on December 28, of **Mr. F. G. Ticehurst,** A.M.I.E.E., who was for 18 years a member of the staff of the B.E.A.M.A. Earlier he had served for 17½ years with Lancashire Dynamo & Crypto Ltd., Manchester, and joined the British Electric Transformer Co. Ltd., at Hayes, in 1929, with whom he remained until he joined the B.E.A.M.A. He was for 16 years second-in-command in the B.E.A.M.A. Transformer Department.

We hear with regret of the death, on January 13, of **Dr. H. R. Wright,** Ph.D., aged 73, chairman and managing director of Siemens Brothers & Co. Ltd. He had been at the Woolwich works about 43 years, having gained earlier experience at the Stafford works, and at the Siemens' works in Vienna. At Woolwich, he was appointed general manager of the firm in 1925, and managing director in 1926. He had a number of inventions to his credit, notably a tram lighting system based on armature reaction, and an electro-hydraulic system of ship steering. He also initiated the prototype of the Hais cable, through which petrol was pumped across the Channel during the invasion in the last war.

We note the death, on January 10, of **Mr. W. E. Gough,** A.M.I.E.E., aged 50, of the B.T.H. aero-magneto engineering and design staff, Coventry.

Mr. J. A. Metcalf, M.I.Mech.E., chief engineer of the Northern Divisional Coal Board, has died after a long illness at the age of 57. Before nationalisation of the mines, he was chief engineer with Hartley Main Collieries, Ltd., Northumberland. He was a past president of the Institution of Mining Electrical and Mechanical Engineers (North of England branch).

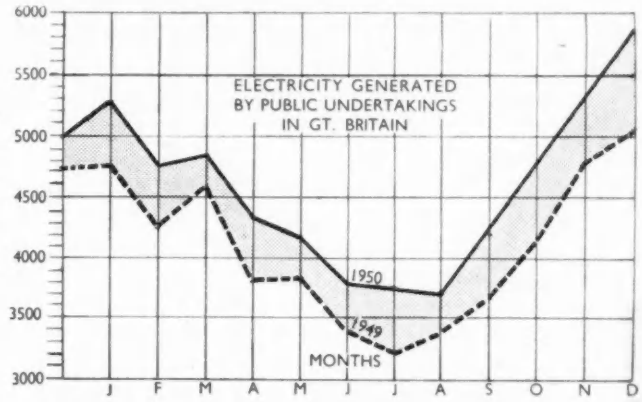
The death occurred recently of **Mr. W. Fletcher,** aged 76, head of Fletcher Bros., electrical engineers and contractors, of Newcastle-upon-Tyne, who had been in business since 1900.

UNITS GENERATED

5,905 million units was the total generated during December, 1950, in stations under the control of the B.E.A., the North of Scotland H.E. Board, and the Lochaber Power Co. The corresponding figure last year was 5,040 million, so there has been an increase of 17·2%.

Of the total, 5,730 million units were generated in steam stations, and 150 million in hydro-electric.

Energy sent out during the month was 5,594 million units, 94·7% of that generated. This gives the total for 1950 as 55,014 million units, an increase of 12·0% on 1949.



POWER SUPPLY IN DECEMBER

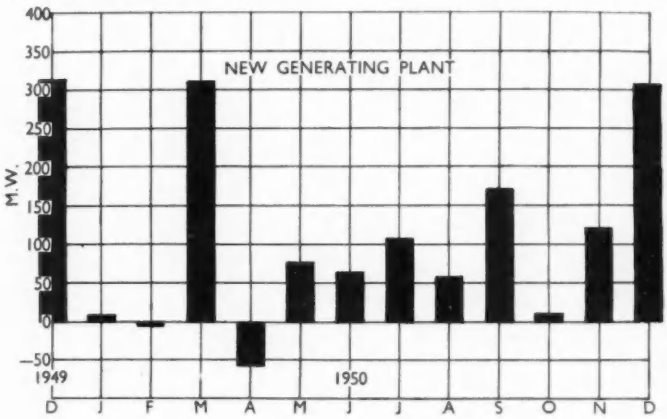
ELEVEN stations figure in the list of generating plant installed by the B.E.A. during December, when a total of 295 MW of sets and 3,055 klb/hr of steam raising plant was brought into commission. Starting with the South of England, the first 50 MW M.V. set was installed at Poole (Southern Division), together with a 300 klb/hr I.C. boiler. At Hayle (S.W. Division) a 20 MW English Electric set came on load, and at Croydon (S.E. Division) a further 52.5 MW M.V. set and a 320 klb/hr Simon-Carves boiler.

Cliff Quay (Eastern Division) commissioned its fifth 45 MW M.V. set, and Walsall (Midlands Division) the eighth 180 klb/hr Babcock and Wilcox boiler. In the E. Midlands Division, stations which brought more plant into operation are Nottingham (a 320 klb/hr I.C. boiler) and Staythorpe (a B. & W. boiler rated at 240 klb/hr). In Wales, Llynfi records a new 300 klb/hr Stirling boiler.

At Thornhill, near Dewsbury in the Yorkshire Division, a 45 MW English Electric machine was commissioned, together with a 180 klb/hr Mitchell boiler, while farther north, Agecroft is again in the news with a 52·5 MW M.V. turbo-alternator and a 315 klb/hr I.C. boiler.

Scotland figures in the returns for the first time for several months. In the S.W. Scotland Division two 180 klb/hr boilers have come into operation at Clydes Mill, together with a 30 MW English Electric set, while in the Portobello station (Edinburgh) an International Combustion 540 klb/hr boiler was steamed.

When this month's results are taken into account, the new plant brought into service by the B.E.A. during 1950 becomes 1,034 MW in terms of sets at m.c.r., while the combined boiler rating is 11,493 klb/hr. So the four-figure aim was achieved.



GENERATING PLANT

At the end of December 1950, the installed capacity of the B.E.A. was 14,557 MW, showing an increase of 289 MW during the month. In the same period the North of Scotland total increased by 21 MW, becoming 528 MW. The figure for overall increase in the calendar year is 1,170 MW, or 8·4%.

The installed capacity for the purpose of this graph should be distinguished from the output capacity. The installed capacity is the total m.c.r. of all the generating sets which are connected on both steam and electric sides and are suitable for service.

Trading Problems Still Unsolved

MANY of the problems which have arisen since nationalisation of the electricity supply industry still remain unsolved, Mr. Victor Watlington, chairman of the Electrical Fair Trading Council, reveals in his annual report covering the year 1949/50. But he feels confident of the future whilst the sections of the industry are prepared to meet round the common table of the Council and in its forum continue to consult before taking unilateral action which might disrupt the established trading structure which has been built up in the electrical industry.

Details of the revisions to the Council's trading policy, embodied in the fourth edition, have already been given in our pages. It is noted that there have been more changes in the policy since the edition was published in October, 1945, than at any other time since its introduction indicative of the Council's desire to keep pace with the requirements and developments in the industry.

During the year, the Council's constitution has undergone a revision, a slight adjustment being necessary because of the Electricity Act, 1947. In addition, a new feature has been introduced which now allows the election to membership of any person, not necessarily in the electrical industry, whose experience would enhance the Council's work and objectives. Three meetings of the Council and six of the General Purpose Committee were held during the period under review, in addition to four others to consider special subjects. The particular position in the industry of the English and Scottish Co-operative Wholesale Societies, for terms, has been actively examined. The Fair Trading Council has also been asked to give evidence before the Monopolies and Restrictive Practices Commission.

To assist protagonist of fair trading codes in Australia, South Africa and New Zealand, contact has been maintained with representatives of the electrical industry in those countries, although progress as yet is slow. In Australia, however, a start has been made with one of the policy schedules and it is hoped to bring other schedules into operation by progressive steps.

TWO I.E.E. HONOURS

Mr. T. L. Eckersley

AT last Thursday's meeting of the Institution of Electrical Engineers it was announced that the Council has elected Mr. P. V. Hunter, C.B.E., M.I.E.E., F.Amer.I.E.E., past-president, to honorary membership of the Institution for his outstanding service to the electrical industry, and awarded the Faraday medal to Mr. T. L. Eckersley, B.A., B.SC., Ph.D., M.I.E.E., F.R.S., for his achievements in radio research, particularly his contributions to the theory and practice of radio-wave propagation. Born in 1883, Mr. Hunter is an old Faradian. He gained early experience with the Great Yarmouth and Willesden undertakings, and subsequently obtained an assistant engineer's appointment with the late Robert Hammond, the well-known consulting engineer and electricity supply pioneer. In 1904 Mr. Hunter joined Merz and McLellan's staff at Newcastle-on-Tyne, staying with them 15 years and becoming head of the electrical department. This gave him large experience of power stations, waste heat generating stations and railway electrification schemes in South America and Australia. During the 1914-18 war he was engineer-director to the Experiments and Research Section of the Anti-Submarine Division of the naval staff. In the second world war his invention of the buoyant cable contributed largely to the defeat of the magnetic mine. Mr. Hunter joined Callender's Cable and Construction Co. in 1919 as joint manager and chief engineer, and became a director in 1937. He is now deputy chairman of B.I. Callender's Cables Ltd. and chairman of B.I. Callender's Construction Co., Ltd. Mr. Hunter has devoted special attention to the development of electrical transmission; he invented the 'split-conductor' and 'four-conductor' methods of automatic cable protection, and of several systems of automatic discrimination for electric power transmission systems. He has for many years been chairman of the N.R.E.I.C. and has represented the I.E.E. on numerous technical committees.

Mr. P. V. Hunter

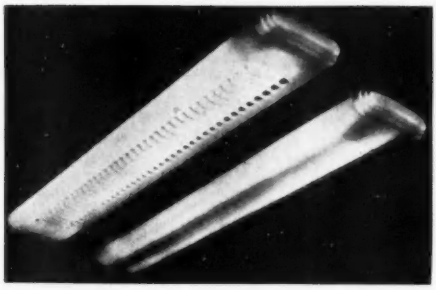
Mr. Eckersley started with the N.P.L. in 1910, and after war service, during which he was engaged on wireless intelligence, joined the Marconi Wireless Telegraph Co., Ltd. His work with that company has been chiefly concerned with radio-wave propagation—a field in which he has won a world-wide reputation. Among his outstanding achievements have been his prediction of the performance of short-wave services, and the application of phase integral theory to propagation problems. In addition, his experiments in connection with the interpretation of random echoes from the ionosphere led him to his now well-known theory of scattering, which helped to locate enemy submarines in rough weather.

The BUYER'S *Column*

Atlas Twins Simplify Matters

REMARKABLE inasmuch as it is available in twin form is a new "Atlas" lighting fitting by THORN ELECTRICAL INDUSTRIES LTD., 105 Judd Street, London W.C.2.

Housing two 80-watt fluorescent lamps the fitting has the same control gear and chassis, but the one-piece diffuser in "Perspex" is available either in a louvre or a clear reeded design. Opal "Perspex" end-caps are used and these combined with a special shallow chassis produce an impression of a translucent light source suspended in mid air.



The fitting is also remarkably free from end shadows and dark patches. Both starter switch and Quickstart systems of control are available. If the latter type is required a letter "Q" is added to the catalogue number.

Prices excluding lamps but including control gear are as follows: FJ/2080, £21 3s. 6d. (p. tax £3 13s. 2d.); FJQ/2080, £22 plus p. tax £3 13s. 2d.; FJL/2080 (louvre diffuser), £22 3s. 6d. plus £3 18s. p. tax; FJLQ/2080, £23 plus p. tax £3 18s.

Fault-Indicator Relay by G.E.C.

A COMPACT design of auxiliary relay for fault indication has been developed by THE GENERAL ELECTRIC CO., LTD., of Magnet House, Kingsway, W.C.2. Designed on telephone-relay lines, it is suitable for mounting in rows, has a separate flag indicator and can be supplied with 3-12 contact springs, each capable of carrying 5 amps at 250 V a.c./d.c. An interesting feature is that the same relay can be used with contacts either self-resetting when de-energised, or with a simple modification, with contacts which lock in until the flag indicator is manually reset.

Glass Insulation

MUCH information of use to users of inorganic insulation was presented at the electrical convention organised last May by FIBREGLASS LTD. The six papers presented at the convention, together with the discussions that followed on their reading, have now been collected and issued as a 66-page bound volume that will doubtless be valued as a reference volume by many interested engineers.

New Projection TV Model

PHILIPS ELECTRICAL LTD., Century House, Shaftesbury Avenue, W.C.2, have made an addition to their range of projection television receivers.

The new model, 1800A, is a console version of the 600A, and gives the same size picture, i.e. 13¾ in. x 10¼ in.

It employs the same optical system as in the previous models to give the large picture, and once again the same advantages are present, the picture is "true-to-life" on a completely flat screen with no glare; it can be viewed in greater comfort by a large number of people. This model is for use on a.c. mains only, between 200 and 250 V at 50 c.p.s., and has a working consumption of 160 W. The four controls are brightness, focus, contrast and sound volume combined with on/off switch.

The receiver incorporates a super-heterodyne circuit which accepts the lower vision sideband.

Interference limiters are included for both sound and vision channels; the sound limiter being fixed, while the vision limiter is variable to suit any condition of interference.

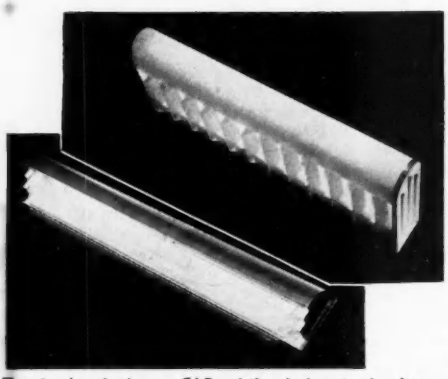
Price is £96 12s. (tax paid).

Philips' attractive 1800A TV console

Bathing in Reflected Glory

TWO inexpensive mirror lighting fittings have now been marketed by COURTNEY POPE (ELECTRICAL) LTD.

The first, the Amhurst two-light mirror fitting C.15 is a completely enclosed "Perspex" unit, with plastic louvre underside and is particularly suited for mounting over wall mirrors in fitting rooms and in speciality shops.



Top is the Amhurst C15 whilst below is the Liteover C16 fitting for fluorescent or filament lamps

This two-light fitting is for 2 ft. 20 W lamps, has a sheet metal frame with detachable fins on the end plate over the fitting, giving easy access to the control gear which is of the "Quick start" category. Standard finish is white stove enamel with bronze ends.

The "Liteover" (C.16) fitting is available for use with either a fluorescent lamp of the 2 ft. 20 W size with control gear supplied separately for installation in a remote position, or for use with two 30 W or 60 W filament strip lights.

The sheet metal frame of this fitting is fitted with special slots to take three glass illuminating louvres.

New Prices

THE POWER CENTRE CO. LTD., Lloyd Street, Wednesbury, Staffs., have found it necessary to review the prices of their aluminium alloy cable trunking fittings.

Fortunately they are not making an overall percentage increase, but are adjusting the list prices of some fittings and have issued stick-in slips for insertion in pages eight and nine of their lists 48 and 48a. Included in the price changes are blank ends, flanged couplings, sleeve and reducing couplings, elbows, half normal bends, radius tees and bends, 4-way boxes and tee pieces.

Also announced are new prices for "Bafflette" extension loudspeakers and chassis which are manufactured by RICHARD ALLAN RADIO LTD., Bafflette House, Batley, Yorks. These new prices are effective as from January 8, and are set out in a schedule available from the company.

The "Sunvic" Story

SOMETHING refreshingly new in the production of technical sales literature is "The Sunvic Story," a brochure which has just been issued by SUNVIC CONTROLS, LTD., Sunvic House, Essex Street, London, W.C.2.

Cutting reading matter, often so indigestible, down to a minimum, Sunvic have presented their "Story" in pictures which have much "eye appeal."

The range of "Sunvic" products includes the "Simmerstat," well known to most housewives, an electronic proportioning resistance temperature controller, d.c. amplifiers, energy regulators, thermostats and time delays. These are found everywhere, in railway signalling, chick brooding, in the "Comet" air liner and the R.M.S. *Queen Mary* for a few examples.

Backing up the story of Sunvic's success are a series of pictures showing close-ups of the processes and of some of the shops which make the reasons for this success most obvious.

Furnace Safety Systems

THE necessity for safety systems in gas and oil-fired systems is so well appreciated by engineers that we need not dwell on them in these columns. There are, however, many different types of equipment, amongst them the photo-electric cell.

ELCONTROL, LTD., 10 Wyndham Place, London, W.1, are specialists in the design and production of industrial electronic equipment, and to follow up the F.SC control system announced a short while ago they have now introduced the F.SP system.

This system is similar to the F.SC system which incorporated a temperature sensitive steel probe and was suitable particularly for the gas-fired furnace, but incorporates a photo-electric flame viewer PFV-1. Both this and the F.SC control unit are now housed in substantial dust-proofed cast alloy cases.

An Interesting Absorption Meter

MANUFACTURED by the EDISON SWAN ELECTRIC COMPANY LTD., 155 Charing Cross Road, London W.C.2, for sale by FILTRATORS LTD., 92 Seymour Place, London W.1, is an interesting instrument designed for the rapid routine measurement of fine suspension and colour in liquids.

This is the "Filtrol" photo-electric absorption meter which, designed primarily for examination of water samples, has great advantages over the normal visual methods of colour comparison. Not only can the colour and turbidity of natural or heated waters be measured, but also any chemical constituent can be estimated.

The principle involved (governed by Beer's and Lambert's Laws) is a precise measurement of the light absorbed by the liquids under test by means of a stable vacuum caesium antimony photo cell.

The "Filtrol" equipment is self-contained inasmuch as it only requires connection to a normal power supply point.

NEW LITERATURE

Technical Data On Fuel

edited by H. M. Spiers, M.A., B.SC., F.R.I.C.

IN 1928 a publication under this title appeared as part of the British contribution to a sectional meeting of the World Power Conference. Such a collection of tables of constants and short descriptions of methods of measurements evidently satisfied a real need, for the fifth edition of this work has now appeared, taking account of many wartime advances. The information given in previous editions is largely repeated, and the admirable practice of providing plenty of space for the user's own notes and figures is continued. Notable new matter includes the N.C.B. classification of coals, additional steam and specific heat tables, and notes on the use of the heat content-temperature diagram.

The complete work splits into two parts, the first dealing with general thermodynamics, together with the necessary physical and chemical information, and the second covering the details of gaseous, liquid and solid fuels, with special reference to their combustion. Apart from the importance of its contents, the book wins recommendation as a reference volume on account of its excellent layout for this purpose. Published by the World Power Conference, 201 Grand Buildings, Trafalgar Square, London W.C.2, 515 pages, 7¼ in. by 4½ in., fifth edition. Price 25s.

M.M. Year Book, 1951

MODIFICATIONS have increased the reference value of this very useful volume, notably by the adoption of a colour scheme by which certain important sections are now visible at a glance; further facility is the addition of the town after each firm's name in the classified lists. A new section, which will be appreciated, gives suppliers of ferrous and non-ferrous metals in various forms. As before, the volume includes lists of Chambers of Commerce, Associations, Government Departments, machinery merchants, etc., most of the sections having been considerably extended. Published by Machinery Market Ltd. 606 pp., 8½ in. by 5½ in. Price 15s.

Electronics In Engineering

by W. Ryland Hill, M.E.

TEXTBOOKS on electronics are appearing somewhat frequently now that it is becoming widely realised that every engineer should have some knowledge of the subject. The present volume stands out amongst those which have been written for the non-specialist student of graduate standard, because it presents its facts in a way that can be applied readily to measurement and operation in some field of science or engineering.

The elements of electronics are quickly passed in an introductory chapter, and the author goes on to deal with diodes. Rectifier circuits are considered next, and this plan of taking the application after the component is continued throughout the volume. Apart from chapters on the various types of valve, there are sections on control circuits, on feedback, on the c.r.o. and on valve voltmeters. Three excellent chapters provide a simple introduction to the practical amplifier and oscillator. Although of American origin, there is little to prevent this book being used by British students to their great advantage. Published by McGraw-Hill, 274 pages, 9 in. by 6 in. Price 30s.

BOOKS RECEIVED

Electrical and Radio Dictionary, by C. H. Dunlap, E. R. Haan and L. O. Gorder. American book including symbols, formulae and diagrams. Published by the Technical Press Ltd., Gloucester Road, Kingston Hill, Surrey, 133 pages, 8 in. by 5 in., fourth edition. Price 14s.

Principles and Practice of Radar, by H. E. Penrose and R. S. H. Boulding. Comprehensive textbook, with additional matter on microwaves, slot aerials and marine radar. Published by George Newnes Ltd., 708 pages, 8½ in. by 5½ in. Third edition. Price 42s.

Chromium Plating, by E. S. Richards. Practical textbook. Published by Charles Griffin and Co., Ltd., 42 Drury Lane, London W.C.2, 154 pages, 8 in. by 5½ in., third edition. Price 17s.

Television Receiving Equipment, by W. T. Cocking. Practical notes and theory. Published by Iliffe and Sons, 375 pages, 8½ in. by 5½ in., third edition. Price 18s.

Transformers, by F. C. Connelly. Comprehensive design manual sub-titled "Their principles and design for light current engineers." Published by Pitman, 490 pages, 8½ in. by 5½ in. Price 35s.

Short Wave Wireless Communication, by A. W. Ladner and C. R. Stoner. Standard advanced textbook. Published by Chapman and Hall, 717 pages, 8½ in. by 5¼ in., fifth edition. Price 50s.

An Introduction to Servomechanism, by A. Porter. A concise treatment for physicists. Published by Methuen and Co., Ltd., 154 pages, 6½ in. by 4 in. Price 7s. 6d.

Atoms and Atomic Energy, by R. W. Hallows. Simple, non-technical explanation. Published by Chapman and Hall, 196 pages, 7¼ in. by 4¾ in. Price 10s. 6d.

Semi-Conductors, by D. A. Wright. Concise introduction to subject for physicists. Published by Methuen and Co., Ltd., 130 pages, 6½ in. by 4 in. Price 7s. 6d.

Industrial Application of Gas-Filled Triodes, by R. C. Walker. Summary of tube characteristics and details of application to control circuits. Published by Chapman and Hall, 325 pages, 8½ in. by 5½ in. Price 40s.

BRITISH STANDARDS

Long-period High-sensitivity Tensile Creep Testing, *B.S. 1686.* **Medium-sensitivity Tensile Creep Testing,** *B.S. 1687.* **Determination of time to Rupture Under Stress With or Without Measurement of Creep Strain,** *B.S. 1688. Price 2s. each.* The increasing use of metals at high temperatures during recent years has rendered it essential that satisfactory information should be available about the behaviour of metals at these temperatures. This automatically has given rise to a considerable increase in creep testing, and has in its turn shown the need for standard methods and equipment in order that proper comparisons may be made and correct interpretations given to the tests made by different authorities.

The standards originated in specifications that had been prepared specially to meet the needs of the aircraft industry, and it had been originally intended that they should be published in the series of British Standards for aircraft materials and components.

It became clear that the field of application was so wide that the restriction of the standards to this series was not justified, and accordingly they have been published in the general series.

Cartridge fuse-links for use in railway signalling circuits. *B.S.714 : 1950. Price 2s.* First issued in 1936, has now been revised in order to bring the range of fuses concerned into line with modern developments in design and manufacture.

In other British Standards, current ratings have been assigned only to fuses and not to cartridge fuse-links, because cartridge fuse-links are not necessarily interchangeable in fuses of different types without alteration of the characteristics of the fuses. For the fuses dealt with in this standard, however, the influence of the surroundings of the cartridge fuse-links is small, the type of fuse holder being standard. This British Standard has therefore been drawn up to cover fuse-links suitable for use in railway signalling circuits in which the declared voltage does not exceed 250 V between conductors or between conductor and earth.

The specification lays down standard current ratings and standard dimensions; it deals with manufacturing requirements, end-caps, marking, performance and the type tests required.

Copies of these standards are obtainable from the B.S.I., 28 Victoria Street, S.W.1.

Coal—Movement and Storage

COAL distribution is a live topic at the moment, a fact which made timely a recent Institute of Fuel paper by Mr. L. G. LOCKET, M.INST.F., entitled "The Transport and Storage of Coal." Early in the paper the point is made that as a result of the war, there is a tendency for consumers' requirements to be subordinate to railway requirements. When matters return to normal it is to be hoped that if a customer expresses a preference for a certain coal, he should be allowed to have it, whatever the geographical differences.

With regard to railway wagons, standardisation in large sizes and common ownership are points that lead to more economic working than in pre-war days. A 16-ton all-steel wagon has been adopted by the Ministry of Transport. Canal transport has many features in common with rail transport, but the unit is the barge of 25 to 30 tons capacity. Canal transport is cheap so long as both the colliery and the receiving point are served directly by canals.

Sea-Borne Coal

The great difference between rail and canal transport on the one hand, and sea transport on the other, is that a steamer is not a standardised unit, and that the freight payable between two points is not standardised, varying with size of ship and with the state of the market. Large ships are usually the most economical, the limiting factor being the length and breadth of the discharging berth and the nature of its approaches. For London berths, ships up to 4,000 tons are acceptable.

At the consumer's premises arrangements have to be made for stocking coal, both in a "tactical reserve" and in a "strategic reserve." The tactical reserve is organised to meet day-to-day variations in demand, and should essentially be situated at a point where delivery to, and withdrawal from, stock is easy. As this stock is small compared with annual consumption, and is withdrawn several times during the year, it can be carried in a comparatively small area. The important point is that a firm floor, preferably of concrete, should be provided, and that there should be some kind of bays, preferably with brick walls, to contain the coal.

Strategic stock may be situated at a considerable distance from the point of consumption, and will usually be of such an amount as to require a relatively large storage space. A rope drag scraper is often effective and economical in handling such stocks.

THE WEEK

INDUSTRY *in news* COMMERCE

Exports up, but Difficulties Ahead

ADDRESSING a Press conference in London last week, the Chancellor of the Exchequer had good news for British manufacturers engaged in the formidable task of maintaining the country's rate of exports. The volume of exports during 1950, he said, was about 15% higher than the previous twelve months. Having planted the feather in British industry's cap, the Chancellor immediately caused it to wilt with grave warnings about the rearmament programme and its possible effect on export trade.

Some facts about what Mr. Gaitskell called the "success story" of 1950 will be of interest to electrical engineers. Although one-fifth of the increase in value of exports last year had been provided by the motor industry, other major contributors were manufacturers of electrical machinery and refrigeration equipment. Vehicles and machinery, said the Chancellor, had accounted for one-third of all goods exported, but with the addition of iron and steel, non-ferrous metals and electrical goods, the proportion rose to nearly 50%. It will be noticed, however, that these industries are the ones most vulnerable to the effects of the rearmament programme.

Asked afterwards whether rearmament would be given priority over the dollar export drive, the Chancellor said it was impossible to make either more important than the other, but where they clashed each case would be considered on its merits and decisions made accordingly. He also assured his audience that the dollar situation would not be allowed to interfere with the import of raw materials. Finally, Mr. Gaitskell expressed the hope that exports would at least be maintained during 1951, despite the shortage of materials and the demands of the defence programme.

Board Opposes B.E.A. Assessment

THE South-East Scotland Electricity Board has again taken up the cudgels with the B.E.A.—this time over the question of the system of payments imposed by the Central Authority to replace the rates formerly paid by electricity undertakings to local authorities. In a memorandum protesting to the B.E.A., the Board assert that the bases of allocation followed in 1948-49 and 1949-50 have resulted in the South-East and South-West Scotland areas paying, over these two years, £136,570 in aid of English rates.

The memorandum states that these bases of allocation have unjustifiably increased the liability of South-East Scotland from £124,000 in the last pre-vesting year (1947-48) to £184,000 in 1948-49 and £188,000 in 1949-50; and on the basis of adjusted profits recently discussed by the central authority in relation to 1950-51 this liability would be further increased to £221,000.

The Board does not agree to the application of any principle of apportionment of the contribution simply because it has been accepted in England. In their view account must be taken of the difference between English and Scottish rating and valuation law, and the exceptionally wide variations in rates per £1 between local authority areas in Scotland. It is argued that rates in Scotland have always tended to be a smaller component of electricity costs and industrial costs generally than those in England.

In the view of the Board, it is necessary to provide, in any basis of allocation of rate payments for Scotland, that (1) the total contribution by the two Scottish Boards, paid either directly or through the bulk supply tariff, should not exceed the statutory total which municipalities in S.E. and S.W. Scotland receive by way of contribution to rates; (2) the total sum referable to the two Scottish Boards should be divided between them either in proportion to respective pre-vesting rate payments, or in proportion to the respective actual annual rate burdens in each of the areas, as calculated from the return of rates.

Under such proposals the contribution in lieu of rate payable by the S.E. Scotland Board in 1950-51 would not exceed £150,000, and the Board are not prepared to make any payment in excess of that figure unless in compliance with a formal statutory direction issued to them by the Central Authority.

World Power Statistics

THE fifth *Statistical Year Book of the World Power Conference* has just been published by the

The First Half-Century

Let it be granted as a general proposition that in the 80's or early 90's Professor Ayrton discovered and communicated to various learned societies all that is known or that can be known about electrical engineering and electro chemistry including resonance, capacity, storage cells, automobiles, house wiring and all kinds of electrical instruments. Certainly Professor Ayrton, lecturing on his own superiority, is an exceedingly amusing spectacle.—*From our issue of January* 17, 1901.

Conference's Central Office in London. It is the second post-war issue and in the main it covers the years 1946 and 1947, although where data was available 1948 has also been included. Some revised statistics for the eleven years before 1946 (which were dealt with in the preceding volume) can also be found among the Year Book's pages.

As far as electricity is concerned, only approximate totals have been given for most continents. Data for the U.S.S.R. has been excluded due to inadequacy of available information. However, installed capacity in the rest of the world amounted, during 1947, to at least 112,500 MW, while production lay in the region of 500,000 million kWh. In electricity supply undertakings in North America, 61% of the installed capacity was fuel-operated, and 55% of electricity generated was produced in fuel-operated plants. Comparable figures for European undertakings are unfortunately incomplete, but they suggest percentages of 60% in both cases. As in previous years, there was greater emphasis on the development of hydro-electric plant, as opposed to fuel-operated plant, in Europe than in the U.S.A. Comprehensive tables set out the annual statistics of production and distribution of supply undertakings and also the generation and distribution of electricity by industrial establishments under each country.

In a section devoted to water power, some indication of the growth of hydro-electric development is given by the average percentage increase in installed capacities of generators, the totals, compared with 1946, being 102·2% in 1947 and 107% in 1948. The total installed capacities of generators in 1946 was just under 50 million kVA.

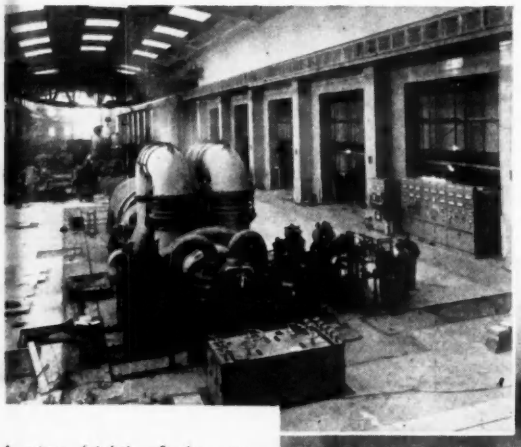
The majority of statistics in this volume were supplied by National Committees of the World Power Conference and by governments and other organisations in the countries concerned. The Year Book is available at the Central Office, 201 Grand Buildings, Trafalgar Square, W.C.2, and is priced at 30s.

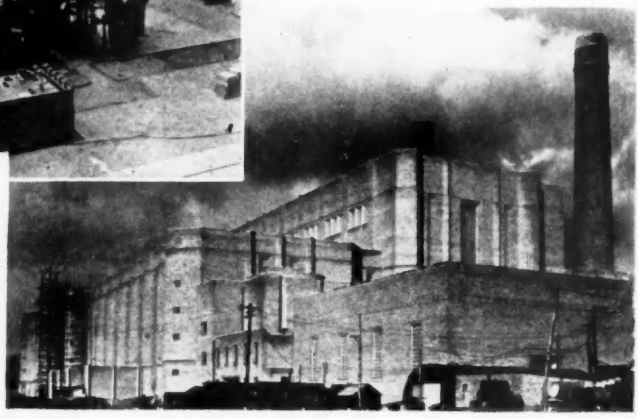
New Company to boost Sales

A NEW company has been formed to further diesel-electric locomotive sales of the Brush-A.B.O.E. group and of their associate company, W. G. Bagnall Ltd. The name of the new company is Brush Bagnall Traction Ltd., whose executive offices are at the Falcon Works, Loughborough. It will handle all the diesel-electric or electric traction business of the combined Brush group, and will form the focal point for the group's products in these fields. Chairman of the new company will be Mr. A. P. Good, and managing director, the Hon. A. C. Geddes. Their fellow directors will be: J. W. C. Milligan, W. A. Smyth, Rex Bate, E. W. Marten, J. Calderwood, and J. T. Rymer. Sales manager is P. J. Martin.

Discussion on Atomic Energy

SECTION I of the fourth World Power Conference, held on July 14, 1950, was devoted to a discussion and papers dealing with atomic energy. The report of the discussion is now available from the Fourth World Power Conference, 201-2 Grand Buildings, Trafalgar Square, London, W.C.2, at a price of 2s. The report is almost verbatim, the speeches being taken down and transcribed into the language in which they were delivered (English or French) with the exception of Prof. V. A. Golubtsov (U.S.S.R.), who spoke in Russian and has





A view (right) of the new Croydon "B" power station with the switch house in the foreground, and (above) the main turbo-alternator with the control panel on right of the picture. Present output is approx. 52,500 kW from one generator, but will eventually be stepped up to 210,000 kW when all four generators and eight boilers are completed

The Vauxhall factory, showing the even level of illumination achieved in the large workshop resulting from the installation of Mazda universal trunking

been translated into English. Although the report will be included in the bound transactions of the conference, it has, in view of its special interest and importance, been made a separate booklet for advance publication.

E.E.B. Emphasises Refrigeration

THE Eastern Electricity Board expects to reap considerable benefit and assistance in its overall trading position from the sale of refrigeration equipment which has already been carried on with marked success in the Norfolk, Suffolk and Fens sub-areas. Installation and maintenance of this equipment has been so successful in these districts that the Board has decided to extend its activities to the whole area.

At the present time when so many are criticising the sale of electrical appliances, which dissentients claim increases the consumption of power, the Board's campaign is particularly praiseworthy, because the greatest use of refrigerators occurs when demand for electricity is at its lowest.

Large-scale Industrial Lighting

FOLLOWING several years of research, the British Thomson-Houston Co. has developed a system of lighting which provides a simplified method of installation for large-scale industrial schemes. The system, now known as Mazda universal lighting trunking, has been installed at the new factory of Vauxhall Motors at Luton, and the accompanying illustration shows the extent of the workshops, which are one-third of a mile long and 480 ft. wide, and the excellent effect of the lighting.

The basic feature was the use of extended aluminium trunking, there being a number of advantages to be gained from extruded sections. For instance, the incorporation of an extruded tee-slot enables the control gear to be placed anywhere, thus obviating the necessity for the drilling previously required for this purpose, and similarly lamp reflectors may be attached in the same way. Wiring for other services, such as clocks, visual signals and loudspeakers, can all be accommodated within the same trunking by providing a special duct in the extrusion.

At Vauxhalls, a total of 36,120 ft of trunking was needed and over 3,400 twin-lamp reflectors were used in the complete scheme. An interesting fact is that the total cost of the installation proved to be less than an equivalent system of individual fittings.

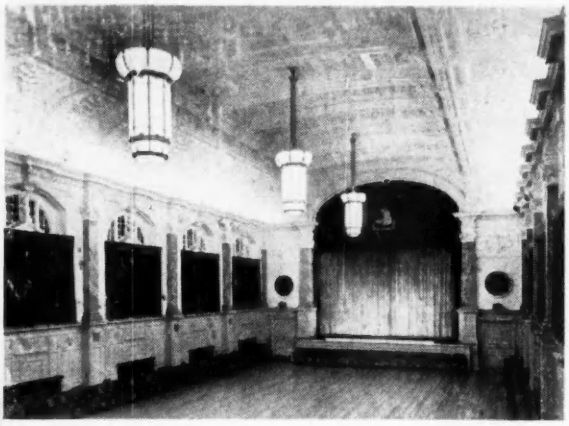
Electricity and Builders

DURING the past twelve months, the Minister of Works has been discussing with his National Consultative Council the recommendations of the Working Party on Building and the Anglo-American productivity team, and considering steps to be taken in the light of those suggestions.

Two points which affect the electrical industry have emerged from the discussions. Some authoritative bodies have, in recent months, been advocating a system of registration among electrical contractors, and proposals for the statutory registration of employers and operatives have also been drawn up by certain organisations in the building industry which are in favour of such a move. These proposals have now been circulated to other interested bodies for their consideration and comment. The second point is that the Ministry of Works has arranged with the B.E.A. a simpler procedure for meeting the cost of providing electrical power on building sites. This has been welcomed by builders because it should ensure the earlier and greater use of electricity on sites and thus enable contractors to employ power-driven tools on building operations.

Electrical Materials Index

ADDING to the monthly figures in the price index of materials of the electrical machinery industry, published on page 10 of our January 4 issue, the Board of Trade announces that the index number for December, 1950 is 142·1, representing an increase of 3·9% over the November figure, which is amended to 136·8 from the provisional index of 135·7. The December rise was mainly the result of increases in the prices of brass, mica and laminated plastic boards.



Three of the new 6 ft pendant fittings recently installed at the East Ham Town Hall. Each contains twenty 5 ft 80-watt fluorescent lamps

Metals Ban Postponed

FOLLOWING representations regarding the postponement of the Order prohibiting the use of copper, brass and zinc in certain manufactures, the Ministry of Supply announced on Tuesday that the Order had been delayed for one month and will now operate from March 1. In addition stocks of semi-fabricated metals and partly processed articles in stock at March 1 are to be allowed to be utilised up to June 30.

Pendant Fitting for Town Hall

THREE decorative pendant fittings, each containing twenty 5 ft 80-watt fluorescent lamps, constitute the main sources of illumination in the recently installed lighting scheme at the East Ham Town Hall. A similar pendant suspended over the gallery contains twelve 4 ft 40-watt lamps and three two-lamp ceiling fittings provide subsidiary lighting. A remarkable fact about these pendants, which were supplied by the G.E.C., is that they are well over 6 ft in height and measure 4 ft in diameter. All have gilt colour metalwork with decorative glassware, and are perhaps, the modern replacement of the old-fashioned chandeliers. In these fittings the lamps have been arranged in three individually switched circuits and have instantaneous start gear so that after using reduced illumination, additional groups of lamps can be brought into operation without any flicker.

In addition to these attractive and striking features, there is a run of cornice lighting along each side of the hall. They are on five individually switched circuits and may be operated independently of the pendant and ceiling fittings.

Inquest on Electrocuted Engineer

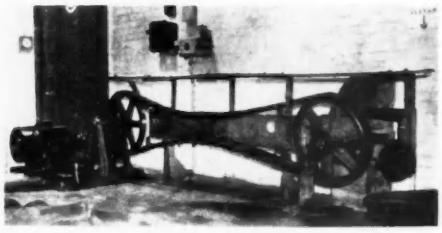
A CORONER'S jury at Norwich returned a verdict of accidental death recently at the inquest on a 27-year-old electrical testing engineer who was electrocuted just before Christmas while working in a high-tension cubicle. A tester inspector at the factory where the man was employed, told the jury that the night before the accident he had left everything ready for testing the next job, and the following morning switched on the circuit breaker. There was a flash, he said, and on switching off and running round saw the deceased lying on the floor.

In the course of the inquest it transpired that the dead man's job on that day was in another part of the workshop, but a third employee had removed a current transformer from the cubicle, and he was replacing it. The company's chief testing engineer referred to an unwritten rule which required anyone working in the cubicle to tie up the switch with string. There was an interlocking device on the cubicle, he said, but it was not connected at the time, although since the accident, steps were being taken to introduce a mechanical as well as an electrical interlocking device. The accident occurred in the works of Laurence, Scott and Electromotors Ltd.

New Tests for Escalator Handrails

FOR some time the L.T.E. has been considering the production of a more satisfactory joint for escalator handrails, but in the course of experiments it was discovered that the efficient testing of new types took far too long. The average life of a handrail is five years, but the derivation of any positive results from a normal service test entailed long delays, so a machine has been designed to submit joints to the equivalent of five years' service in only three weeks.

This machine consists of two newel wheels of the same size as those in an escalator drive, but with one set at an angle to the other. Thus the device produces the bending and twisting which occur in normal service. The inclined wheel is



fitted with tensioning gear and the other is driven by a small electric motor. The handrail is run at 925 ft per minute, over five times the speed required, and continues until one of the joints fails, the number of hours run being recorded and deductions made accordingly.

Television Servicing

THE Radio Trades Examination Board announced recently that arrangements have been made for the examination of candidates who live outside the range of a B.B.C. television transmitter. These candidates will be accepted for the written papers only on the understanding that they will sit the practical examination within twelve months of the opening of a television transmitter in their area. The certificate will not be issued until the completion of the examination. In view of this decision, arrangements are now being made for candidates from Scotland to sit the written papers of the May, 1951 examination.

New Sales Office

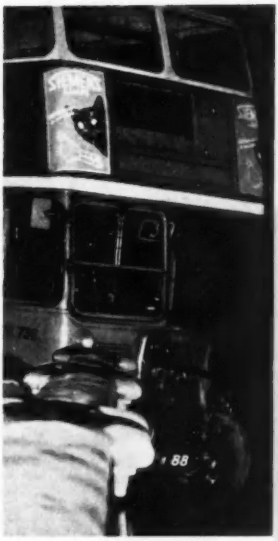
JACKSON BOILERS LTD., manufacturers of tea- and coffee-making equipment, have opened a N.E. Area sales office and showroom at 9 King Street, Leeds 1. The showroom has been specially fitted out for the display and demonstration of "Jackson" quick-service, self-feeding water boilers and the "Filtomaton" system of coffee-making. The sectional display of boilers enables customers to study the simple design and the strength of materials used. Area sales manager is Mr. Edward Armistead.

An Advantageous Accident?

THE collision between the B.E.A. collier *John Hopkinson* and the centre span of Battersea Bridge on March 16 last year has, after all, been beneficial. The unfortunate occurrence afforded the opportunity of laying new electricity supply cables beneath the footways and of removing the obsolete tram tracks. In addition an improved lighting scheme will shortly be installed whereby electricity will replace the old gas lighting. The bridge was reopened to vehicular traffic yesterday (Wednesday).

Economise on Street Lighting

The Minister of Transport has asked local authorities to economise as much as possible with street lighting to help the Government campaign to save fuel. It has been suggested that in most areas a large proportion of street lamps could be switched off at 11 p.m., and in some districts even earlier. In a letter to lighting authorities the Minister points out that no cuts should be made at dusk and early evening when danger of accidents is greatest, and where roads are illuminated the lighting should be kept at full standard.



Was the black cat in Siemens' advertisement a lucky omen for this bus which skidded and crashed through the parapet of Lambeth Bridge? The superstitious will have no doubt that it was, because despite the skid and crash, and the fact that one wheel was suspended precariously 40 ft above the river, no-one was hurt.

"Velotrol" Rectifiers

IN our issue of January 4, under the heading "Progress in Production," we referred to "Velotrol" rectifiers as designed by the Hackbridge and Hewittic Co. Unfortunately, by a printer's error, a paragraph dealing with this subject was transposed to the end of the article and thus appeared under the heading "Richardsons, Westgarth."

NEWS IN BRIEF

The first annual ball of the Hants and Dorset branch of E.I.B.A. will be held at the South Parade Pier Pavilion, Southsea, on January 26. It has been organised jointly by the branch and the Southern Division of B.E.A. Dancing will be continuous from 8 p.m. to 1 a.m., and tickets, from A. Cadman, secretary of the branch, British Electricity House, High Street, Portsmouth, are 10s. 6d. each.

Should Canada allow duty-free entry of engineers' plans, drawings or blueprints of machines, equipment and plant layout, architects' plans, etc., as was provided in the Budget resolutions of June, 1946? Having received representatives for a reversion to the formerly operative duties, the Canadian Tariff Board is holding a public inquiry on the matter in Ottawa on January 30.

According to preliminary statistics by the Swedish State Power Board, power production in Sweden during 1950 increased by 13·5% to 18,300,000 kWh, over 1949. All but 800,000 kWh of that total was water-generated. The present total capacity of the country's hydro-electric plants is estimated at 3,150,000 kW or about 250,000 kW more than a year ago.

Although the venue of the annual Policy Conference of the Electrical Trades Union has not been finalised, the conference has been fixed for the week beginning May 7.

Electric Supply News

Bridgwater

Progress with the extension of electricity to some of the villages was announced at a conference of Bridgwater Rural Council recently. A comprehensive scheme for Bawdrip is to begin this month and Chedzoy is included in the estimate for the current financial year. The Lyng extension is being carried out, and the scheme for Middlezoy and Othery is being submitted by the Board for approval by the Central Board. Stowell is scheduled for next year, and the possibility of Over Stowey and Spaxton being included next year is being investigated, but there is no immediate prospect of supplies to Chilton Trinity, Fiddington or Otterhampton.

Depwade

At its meeting last week, the Depwade Rural District Council approved a resolution urging the Eastern Electricity Board to suspend minimum consumption guarantees during the present emergency, believing that saving which could and would be made in the use of most wasteful domestic and small industrial appliances—notably coolers, water-heaters, cookers and dairy sterilisers—are not now made because such economy would bring consumption below the guaranteed figures.

Dingwall

The Town Council has reached a compromise with the North of Scotland Hydro-Electricity Board on the cost of providing a service to the new housing site at Kinnairdie. The Board had asked £800 in view of the fact that the council gave permission to the Gas Board to install gas cookers. The Electricity Board contended that lighting alone would not make it worth their while to lay a cable. The new agreement is that the council will install electric cookers in an adjoining housing site and that the Electricity Board will then lay the cable free to both sites.

Eastern

Both the Southend-on-Sea Town Council and the Dagenham Borough Council General Purposes Committee have joined in a protest against the Eastern Electricity Board's decision to increase tariffs. At Southend, the Council considers that some contribution should be made by the B.E.A. towards the rural electrification expenditure of the Board in order to bring about the equalisation of charges throughout the country. The Dagenham General Purposes Committee believe that if any increase is necessary it should apply only to unit charges.

Edinburgh

At last week's meeting of the South East Scotland Electricity Consultative Council, Mr. J. M. Airlie intimated that it was likely that the second extension at Portobello power station would be an 80,000 kW set instead of 60,000 kW. He also envisaged the changing over of the present 30,000 kW sets to 100,000 kW units. Plant capacity at Portobello amounted to 150,000 kW, but because of the first extension, two sets totalling 27,500 kW had had to be removed. This left 122,500 kW. Generally one set had to be out of action for repair or maintenance, and this left about 92,500 kW. When the second extension was being introduced a 12,500 kW set would have to be taken out, but it was hoped that this could be put into use at Bonnybridge. It was hoped that this 80,000 kW extension would be ready within the next two years.

Glasgow

Water drawn from the Forth and Clyde Canal for use at Pinkston power station of the Glasgow Corporation Transport Department is to cost more. The Docks and Inland Waterways Executive have informed Glasgow Transport Committee that the charge, originally fixed in 1911, is to be raised two and a half times to ·005d. per kWh. Approval of the Ministry of Transport has been obtained for the placing of a contract for the new 30,000 kW turbo-alternator set at Pinkston with Metropolitan-Vickers Electrical Co., Ltd. Negotiations are proceeding between the committee and the Waterways Executive for the acquisition from them of 5·6 acres of land for the erection of cooling towers and other equipment.

Lincoln

At the recent meeting of the Lincoln City Council, Ald. J. W. F. Hill, chairman of the Finance Committee, suggested that protests should be made at the decision to stop the practice whereby gas and electricity accounts were payable, by arrangements, at local authority offices. The decision to require consumers to pay their gas accounts at the offices of the Gas Board four times a year and their electricity accounts at the offices of the Electricity Board four times a year, was, he said, "stupid and preposterous," at a time when there was a grave shortage of manpower. He added that there would be no virtual saving to the Corporation, whose staff would continue to deal with the rating accounts, and all the additional cost would come out of the consumers of gas and electricity in the shape of increased charges.

LIGHTING SCHEMES

Bromley (Kent).—It is proposed to improve lighting in Blackbrook Lane, at a cost of £500.

Carlisle.—The Public Lighting Committee has proposed schemes for improving lighting in English Street, at a cost of £1,500, Scotland Road, at a cost of £2,500 and in London Road, at an estimated cost of £4,000.

Caterham and Warlingham.—Following a communication from the Ministry of Transport, the U.D.C. Highways Committee has reported that it is apparent that there is no possibility of any large-scale street lighting project involving a transfer from gas to electric lighting receiving approval at the present time.

Friern Barnet.—The council is to spend £3,184 on improving street lighting.

Harrogate.—The Highways Committee has recommended a street lighting scheme providing for the automatic lighting of 80 electric and 424 gas lamps.

Hastings.—The T.C. is to spend over £9,000 this year on illuminations along the sea front and other parts of the borough.

Kendal.—A scheme is to be prepared for the installation of 3-tube fluorescent lighting in Stamongate, mercury lighting in Aynam Road, New Road, Wildman Street and Windermere Road.

Leeds.—In the estimates for the current year, the Street Lighting Committee has included the sum of £10,000 for electric lighting equipment on new estates and £8,000 for main road improvements.

Plymouth. The Street Lighting Committee, has made a survey of the whole of the city's street lighting for the purpose of picking out the worst lit areas for consideration at the earliest possible moment.

Scarborough.—T.C. has applied for sanction to borrow £12,000 for lighting by Electricity of Marine Drive and Royal Albert Drive. M.o.H. has offered no objection to the council's proposal to spend £5,960 of electric street lighting on the Eastfield Estate, parts 1 and 2.

Watford.—The Corporation Highways Committee has approved schemes for the installation of fluorescent lighting in London Road, High Street, St. Albans Road, Clarendon Road and Market Street.

Company Activities

Enfield Cables Ltd.

Holders of the 7½% Cumulative Preference shares last Thursday consented to the £1,500,000 debenture issue. At the next general meeting a proposal will be put that any resolution for repayment by way of reduction of capital of the 7½% Preference should be deemed a modification of rights requiring a separate Preference class meeting.

Northern Ireland

Subscription lists open tomorrow, January 19, for the issue of £2,000,000 Northern Ireland Electricity 3½% stock 1977-80, the proceeds of which will be mainly used in repaying temporary borrowings incurred in carrying out the development programme. The sum of £10 per cent. will be payable on application, another £40 per cent. on January 31 and the balance, £50 per cent. on March 8.

Radio Rentals Ltd.

Consolidated trading balance for the year to August 31 last amounted to £565,923, an increase of £105,936 over the corresponding figure for the previous year. The sum of £304,022 has been allocated for depreciation of radio and television sets, and £45,583 (*£35,715*) to taxation, and the balance is £171,952 (*£150,162*), of which £153,256 relates to the parent company. To tax equalisation £65,000 (*£61,500*), general reserve £25,000 (*same*), and after payment of dividends, including interim Ordinary of 10% (*same*) and final 20% (*15%*), there is £136,755 (*£103,758*) carried forward. The directors propose a share issue in the proportion of one for seven held, at 10s. per share, to Ordinary shareholders.

L. Sterne & Co.

Preliminary statement records a profit of £77,174, against £73,792, for the year to October 31 last, after allowing £83,000 (*£78,000*) for taxation. The sum of £70,745 (*£61,167*) is allocated for depreciation, £15,000 (*nil*) for reserve for tax on initial allowances, and £40,000 (*same*) to general reserve, leaving £56,334 (*£52,970*) carried forward. The Ordinary dividend is again 15% for the year, but on capital which was recently increased by the issue of 26,000 £1 Ordinary shares.

Tata Hydro-Electric Power Supply Co.

Revenue of this undertaking for the year to June 30 last was Rs. 50,84,215 as compared with Rs. 50,74,002 for the previous twelve months. The net profit was Rs. 22,32,865. After payment of dividends the sum of Rs. 1,83,968 (*nil*) has been placed to contingencies reserve, Rs. 2,40,000 to general reserve and Rs. 11,25,000 to dividend reserve, leaving Rs. 35,948 carried forward.

Tata Power Co.

The revenue for the year to June 30 amounted to Rs. 1,19,76,306 as against Rs. 1,17,22,338 for the previous year. Taxation absorbs Rs. 28,46,000 and depreciation Rs. 9,00,000, and the net profit was Rs. 48,31,905 (*Rs. 40,83,648*). After payment of dividends, including Ordinary dividend of Rs. 30 per share, tax free, the sum of Rs. 3,65,536 is placed to contingencies reserve and Rs. 13,40,000 to general reserve, leaving a balance of Rs. 14,455.

Thorn Electrical Industries Ltd.

The directors announce an issue for cash and a scrip bonus. The former consists of 352,500 new 5s. Ordinary shares, at 15s. 6d. each, in the proportion of one for every two Ordinary held. On that offer being completed, it is intended to issue, by the capitalisation of share premium, 1,057,500 new Ordinary shares on the basis of one for each Ordinary share of the then issued Ordinary capital. Details were circulated yesterday, January 17.

Dividends Declared

Bennis Combustion. Interim of 5% (*same*).

Broom and Wade. Final Ordinary dividend of 7½% actual, making 11¼% for the year, on the increased capital. Group profit £442,428 (*£312,130*).

Hilger and Watts. Ordinary dividend of 7½%, net profit, after tax, is £35,373 (*£38,946*).

Commercial Information

CONTRACTS OPEN

HOME

Jan. 20.—Bootle. Supply of electric cables and flexes and electric lamps during year ending March 31, 1952. Borough Surveyor, Town Hall.

Jan. 20.—Exeter. Rewiring of Redhills Hospital, St. Thomas, for E. Devon Hospital Management Committee. F. J. Davis, Group Engineer, Royal Devon and Exeter Hospital, Exeter. Deposit £2 2s.

Jan. 20.—Sunderland T.C. Electrical installation in Thorney Close secondary modern schools. Architects, S. W. Milburn and Partners, 9 The Esplanade, Sunderland. Deposit £2 2s.

Jan. 22.—Musselburgh. Electrical work in erection of 6 houses in Mansfield Rd. Burgh Surveyor, Municipal Offices, High St.

Jan. 25.—Galway. Installation of refrigerating equipment for New Regional General Hospital, comprising two compartment cold room, capacity 385 cu ft, including compressors, and 15 cabinet refrigerators from 40 to 7·7 cu ft. Consulting Engineers, J. A. Kenny and Partners, 44 Kildare St., Dublin C.17.

Jan. 26.—Carlisle. Electrical installation at Belah junior and infants' school. City Surveyor, Fisher Street.

Jan. 29.—Cookstown (Tyrone). Installation of electric light in 8 houses on Fountains Rd. A. Montgomery, Clerk, Council Office, Molesworth Street.

Jan. 29.—West Riding. Renewal of electrical installation at Rothwell grammar school. County Architect, "Bishopgarth," Westfield Rd., Wakefield. Deposit £1 1s.

Jan. 30.—Belfast. Supply and erection of trolleybus overhead line equipment. Documents from Transport Dept., Sandy Row, Belfast.

Jan. 30.—Montgomeryshire. Rewiring and extending the electrical installation at Llwyn Hall, Llanfyllin. County Architect, County Offices, Newtown. Deposit £2 2s.

Jan. 31.—Baildon U.D.C. Supply and installation of 400 W mercury vapour lamps, lanterns and control gear, and concrete standards on Otley Road. Council's Surveyor, G. F. R. Dickinson, Town Hall, Baildon.

Jan. 31.—Newmarket R.D.C. Supply and erection of two vertical spindle centrifugal pumps driven by electric motors; also of a booster pump driven by an electric motor and controlled by automatic gear. Consulting Engineers, Silcock and Simpson, 10 Park Row, Leeds 1.

Feb. 1.—Birmingham. Renewal of electric lighting and power installation at King's Heath police station. H. J. Manzoni, City Engineer and Surveyor, Civic Centre, Birmingham 1. Deposit £2 2s.

Feb. 1.—Lincoln. Electrical installation in proposed Technical College, Kingsway, Scunthorpe. County Architect, County Offices, Lincoln.

Feb. 2.—Belfast. Electricity Dept. invite supplies of various equipment and appliances including transformer kiosks, meters, l.t. fuse units, underground cable disconnecting boxes, washboilers, kettles and cooker boiling plates. Documents from the Dept., East Bridge St., Belfast. (See Jan. 11 issue.)

Feb. 2.—Belfast. Supply and erection of CO_2 fire fighting equipment for protection of 33 kV switchgear. Merz and McLellan, Carliol House, Newcastle-on-Tyne 1. Deposit £5 5s. (See Jan. 4 issue.)

Feb. 2.—Bingley U.D.C. Installation of 400 W fluorescent mercury lighting units along about half mile of trunk road A650. Documents from F. M. Dunwell, Clerk of the Council Town Hall.

Feb. 2.—Southern Elect. Board. Conversion, alteration or adjustment of wireless equipment on Wimpey estate in the Heston district due to change-over from 240/280 V d.c. to 240 V a.c. Documents from S. H. Fowles, district manager, 11 Staines Rd., Hounslow, Middx. (Advertised in this issue.)

Feb. 2.—Tottenham. Council require supply of electric lamps. Tenders to M. Lindsay Taylor, Town Clerk, Town Hall, N.15.

Feb. 3.—Colwyn Bay. Supply and erection of two electric centrifugal booster pumps. Borough Engineer, Town Hall.

Feb. 3.—Prestwick. Supply and delivery of electric lamps and electrical equipment for year ending March 31, 1952. Borough Engineer, Town Hall.

Feb. 3.—Swansea. Electric lamps for public lighting are contained in list of annual supplies for period beginning April 1. Borough Engineer and Surveyor, The Guildhall.

Feb. 3.—Swinton and Pendlebury T.C. Wiring and supply of electrical fittings for 100 houses being built at Clifton estate. Borough Engineer and Surveyor, Town Hall, Swinton, Lancs. (Advertised in this issue.)

Feb. 5.—Luton. Installation of electrical services at Whipperley county primary infants' school a tFarley Hill. Borough Engineer, Town Hall.

Feb. 5.—Westminster. Supply of electric lamps, cable, etc., required for periods of 3, 6 or 12 months from April 1. Westminster City Hall, Charing Cross Rd., W.C.2.

Feb. 10.—Biggleswade U.D.C. Supply and erection of 43 concrete columns, lanterns, 140 W sodium discharge lamps, auxiliary equipment and wiring on trunk road. T. Wilson, Engineer and Surveyor, Church St. Deposit £2 2s. (See Jan. 11 issue.)

Feb. 12.—Castle Ward (Northumberland) R.D.C. Electrical installation in 26 houses at Stamfordham. G. E. Dimmack, engineer and surveyor, North Rd., Ponteland. Deposit £2 2s.

Feb. 26.—Worsborough U.D.C. Supply and erection of 84 street lighting columns with 140 W sodium discharge lamp lanterns, etc. Henry C. Hand, Clerk of the Council, Council Offices, Saville House, Worsborough Bridge. (Advertised in this issue.)

Feb. 26.—Manchester. Electrical installation at Charlestown Infants' School in Pilkington Road. City Architect, Town Hall. Deposit £1 1s.

Feb. 28.—Metropolitan Water Board. Manufacture and erection of 11,000 V and 415 V switchgear and motor control desks, and six transformers at Chingford South pumping station. Chief Engineer, Offices of the Board, New River-Head, Rosebury Ave., E.C.1. Deposit £1 1s. (Advertised in this issue.)

No date stated.—Aberdeen. Electrical work in erection of assembly hall and gymnasium at Kairnhill junior secondary school. J. A. O. Allan, Ross and Allan, Architects, 10 Bon-Accord Square.

No date stated.—Ayrshire. Installation of new switchgear, main cables and sub-main wiring at Cuninghame Home, Irvine, for N. Ayrshire Hospitals. Applications to Jas. H. Ross, Consulting Engineer, 45 Hope St., Glasgow, C.2.

No date stated.—Nottinghamshire. Supply of electrical and wireless goods for C.C. Supplies Officer, Shire Hall, Nottingham.

OVERSEAS

*Details of items marked * may be obtained on application to Room 1076, Board of Trade, Thames House, North Millbank, S.W.1, quoting reference.*

Feb. 8.—Brisbane. Supply, delivery and maintenance of three 10,000 kVA on-load tap changing transformers for City Electric Light Co. Ltd., Boundary St., Brisbane. B.o.T. (Ref. CRE (IB) 50579/51).*

Feb. 15.—New York. United Nations invite tenders for simultaneous interpretation system, including consoles, amplifiers and sound reinforcement system, but not headphones and microphones. B.o.T. (Ref.: CRE (IB) 72994/50).*

Feb. 20.—Uruguay. Tenders invited for supply of 5,500 kilos of common black insulating tape. Required by Administracion General de las Usinas Electricas y los Telefonos del Estado.

Feb. 23.—El Salvador. Firms which have already registered for receipt of copies of invitations to tender are invited by the Executure Hydro-Electric Commission for River Lempa to submit tenders for supply and delivery of aluminium cables with steel core and of the corresponding accessories for h.v. lines from Guayabo plant to San Salvador and San Miguel. B.o.T. (Ref.: CRE (IB) 50601/51).*

March 8.—Brisbane. City Electric Light Co. Ltd. invite tenders for a 240 V station battery consisting of 120 cells and trickle battery charger capable of supplying continuous load of 20 amps. Tenders to the Secretary, Boundary St., Brisbane. B.o.T. (Ref. CRE (IB) 50615/51).*

CONTRACTS PLACED

Durham. Electrical installation at Annfield Plain county infants' school, R. Keeler, £334; and at Jarrow Simonside New county school, Gray Bros., Ltd., £2,794.

L.C.C. Electrical installation at Ritchie secondary school, Rae Electric (London) Ltd.; same at Oldfield Rd. school, Thorpe and Thorpe Ltd. Both exceed £2,500.

Luton T.C. Electrical work in 412 houses. Knights (Hendon) Ltd., £14,394.

Northumberland. Electrical installation at Newburn Westerhope county primary school, Bonham Electrical Engineering Co., £629; at Whitley North county primary and modern schools, Morris and Smiles, £1,560; Newburn Hall county primary school, A. S. Lowery, £480.

Plymouth T.C. Electrical installation at Barne Barton primary school. W. G. Heath and Co., £1,662.

Wakefield T.C. Supply and erection of concrete columns, lanterns, lamps and control gear for street lighting in four roads, the G.E.C. Ltd., £932.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller.

Arrow. 678,235. Class 9. Electric switches, plugs and sockets and thermostats. Arrow Electric Switches Ltd., Hanger Lane, Ealing, W.5.

Catacon. 693,23. Class 9. Electrical condensers. London Electrical Mfg. Co. Ltd., 459 Fulham Rd., S.W.10.

Elliott. 690,595 in design. Class 9. Electrical and mechanical measuring, testing, recording and control instruments and apparatus, etc. Elliott Bros. (London) Ltd., Century Works, Lewisham, S.E.13.

Elremco. 692,311. Class 9. Electrical and scientific apparatus and instruments. Electrical Remote Control Co. Ltd., 15 Evanston Ave., Highams Park, E.4.

Jacex. 687,158. Class 9. Electrical switches, plugs, sockets, bell pushes and switch fuses. J. A. Crabtree and Co. Ltd., Lincoln Works, Lincoln Rd., Walsall.

"Micropack." 683,657. Class 9. Electrical condensers. Telegraph Condenser Co. Ltd., Wales Farm Rd., London, W.3.

(continued overleaf)

Your Queries — Answered

"Kopex" flexible metal conduit, makers of? W.W.—Uni-Tube Ltd., 2 South Audley St., W.1. (19304)

Dellread Gears Co., address of B.C. This firm was taken over many years ago by the Integral Auxiliary Equipment Co. Ltd., Cousins St., Wolverhampton. (19308)

"Aerofier" fan/heater, suppliers of? A.W.—C. J. Fox and Sons Ltd., 117 Victoria St., S.W.1. (19313)

"Schering" bridges, makers of? L.B.—H. W. Sullivan Ltd., Leo St., S.E.15; H. Tinsley and Co. Ltd., 36 Stranger Rd., S.E.25. (19319)

"So-lite" fluorescent desk lamp, makers of? E.B.—Mountsun Ltd., 17 Edge St., W.8. (19324)

"Timemaster" battery-operated clocks, makers of? F.B.—Anglo Time Corpn. Ltd., Brookhouse Mills, New Mill St., Blackburn. (19328)

"Alert" fuses, makers of? M.I.—Kenneth E. Beswick Ltd., Merchants Barton, Frome, Som. (19332)

"Litlux" lighting fittings, makers of? A.W.—Louis Dernier and Hamlyn Ltd., 23 Newman St., W.1. (19335)

The above are selected from questions we have answered this week. If you have a query, send it to us.

Staticon. 693,674. Class 9. Pick-up tubes, iconoscopes, monoscopes, etc., for television. Cath-Odeon Ltd., Meadowcroft Laboratories, Church St., Cambridge.

Stanex. 687,160. Class 9. Electrical switches, plugs, sockets, bell pushes and switch fuses. J. A. Crabtree and Co. Ltd., Lincoln Works, Lincoln Rd., Walsall.

Victrol. 691,967. Class 16. Electrical insulating oils. Newton Victor Ltd., 15-19 Cavendish Place, W.1.

Vidor. 693,158. Class 9. Wireless, television and telegraphic instruments and apparatus, etc. Vidor Ltd., West St., Erith, Kent.

TRADE NOTES

Branch Office. Micramatic Ltd. have established a branch office and stores at Britannia House, Wellington St., Leeds. Telephone Leeds 24988.

Changes of Address. As from February 1, the address of Watson & Sons (electro-medical) Ltd., will be East Lane, North Wembley, Middx. (Telephone Arnold 6215).

C. MacKechnie Jarvis and Partners, consulting engineers, have moved to Arithmos House, 8 Craven Rd., W.2.

The Southampton office of the Lamp and Lighting Department of the Metropolitan-Vickers Electrical Co., Ltd., is now at 2 Oxford St., Southampton. Tel. 76649.

The offices of the Lapointe Machine Tool Co., Ltd., have now moved to the new factory buildings at Otterspool, Watford By-Pass, Watford. Tel. Gadebrook 3711.

New Showrooms. Recently changed into a limited company, G. D. Harrison and Sons Ltd., have opened a new trade counter and showrooms at 55 Northgate, Huddersfield.

G.M. Having completed the move of their factory to Ottery St. Mary, Devon, G. M. Engineering (Ottery St. Mary) Ltd., are in full production again and rapid delivery will be given to all orders for l.t. industrial switchgear. The new factory allows greater scope for expanding production, there now being a modern fabrication shop for switchboard assembly. The firm's central sales office remains at 1 Victoria St., London S.W.1. Telephone Abbey 5095.

PRICES OF CABLE METALS AND OTHER MATERIALS
(at Tuesday night)

	£ s. d.	New York price
COPPER, electrolytic	202 0 0	£196 0 0
Delivered in 2nd and 3rd month after order ...	215 10 0	—
Delivered in 4th, 5th and 6th month after order	217 0 0	—
LEAD, good soft pig (foreign)	136 0 0	136 0 0
.. .. .. "English" quality	137 10 0	
Delivered in 2nd and 3rd month after order, plus	7 0 0	
TIN (99-99.75%) ... ... (Cash) ...	1195-1200	—
.. (3 months)	1190-1195	—
ALUMINIUM, commercial purity (del.)	124 0 0	—
ZINC	151 0 0	140 0 0
ARMOURING:		
Galv. Steel Wire (0.104 in.)	45 10 0	—
Mild Steel Tape (0.04 in.)	26 0 0	—

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

Eleckeradio Instrument Repair Co. Ltd. Meeting of members will be held at 59 Eversley Rd., Sketty, Swansea, on Feb. 14 at 11 a.m., to receive liquidator's report.

Electrical Engineering and Advice Bureau Ltd. Petition for winding-up to be heard in London on Jan. 22. Particulars to Samuel Mickler, 52 Grainger St., Newcastle-on-Tyne, by Jan. 20.

Fluorescent Industrial Installations Ltd. Resolution for voluntary winding-up passed at meeting on Dec. 28. E. F. Weston of 21 Panton St., Haymarket, S.W.1, has been appointed liquidator.

International Refrigerator Co., Ltd. Meeting of members will be held at 11 Ironmonger Lane, E.C.2, on Feb. 19 at 12 noon to receive liquidator's report.

Krivert Ltd. Resolution for voluntary winding-up passed at meeting on Dec. 16. Leslie B. Blackler, Imperial Hse., Dominion St., E.C.2, was appointed liquidator.

Malden-Brown (Electronics) Ltd. Petition for winding-up will be heard in London on Jan. 22, and interested parties should contact Hyde, Mahon and Pascall, 33 Ely Place, E.C.1, by Jan. 20.

Miles Refrigeration Ltd. Meetings of members and creditors at 13 Finchley Lane, N.W.4, on Feb. 15 at 11 and 11.30 a.m., to receive liquidator's report.

Application for Discharge

London. Leo Lawrence O'Connor, electrical and radio contractor, trading as "Paragon Electrical" at 27 Wellington Sq., S.W.3. Hearing fixed for 11 a.m. on Feb. 9 at Bankruptcy Bldgs. Carey St., W.C.2.

Appointment of Trustee

Liverpool. Harold Ward, trading as "H. Ward," radio and electrical dealer, at 107 Aigburth Rd., Liverpool 17. Trustee is Ronald Parkyn Booth, 5 Rumford Pl., Liverpool 3.

BANKRUPTCY ACTS

Receiving Order

Canterbury. Nicolaas A. R. Spreeth, trading as "Refrigeration Installations Co." at Sea St., Herne Bay. Date of order, Jan. 4. First meeting to be held at Official Receiver's Office, 1 The Parade, Canterbury, on Jan. 19 at 11 a.m., and public examination at the Sessions House, Longport, Canterbury, on March 6 at 10.15 a.m.

First Meeting

Windsor. Edward Wm. Thorne, electrical engineer, lately trading at 123 King St., Maidenhead. Meeting was at 3 Central Buildings, Matthew Parker St., S.W.1, on Jan. 16, and public examination to be held at Court House, St. Leonards Rd., Windsor, on March 21 at 11.30 a.m.

Release of Trustees

Dorchester. George L. Barber, electrical contractor and radio engineer, of 19 St. Albans St., Weymouth. Trustee was Clifford Wild, 22 High East St., Dorchester.

London. Walter Gibson, electrical engineer trading as "W. Gibson and Co." at 1a Battledean Rd., and 2d Holloway Rd., Highbury. Trustee was R. W. West, 6 Broad St. Place, E.C.2.

Order on Application for Discharge

Brighton. Reginald Davidson, electrical illuminating engineer, at 199 High St., Lewes. Date of Order, Dec. 7. Discharge suspended for two months.

BUSINESS PROSPECTS

HOME

Ayr. Dean of Guild Court approved plans for erection of 100 houses at Forehill by Scottish Housing Association.

Belfast. A £2 million hospital is to be erected near Belfast by N. Ireland Tuberculosis Authority. Architects are S. W. Milburn and Partners, 9 The Esplanade, Sunderland.

Berkshire. Approval has been sought for erection of county offices on Abbot's Walk site, Reading. Estimated cost is £260,000.

Biddulph (Staffs.) U.D.C. It is proposed to build 200 houses on the Park Lane estate.

Blaby (Leicester) R.D.C. Erection of 28 houses at Croft, 26 at Whetstone, 18 at Countesthorpe and 16 at Cosby.

Blackburn. Approval received for erection of Kelsall Ave. nursery school, at estimated cost of £11,513.

Bullingdon (Oxon) R.D.C. Erection of 26 houses at Culham. Architect is H. W. Smith, 29 George St., Oxford.

Cardigan. It is proposed to erect an infants' school at estimated cost of £40,000.

Coventry. Council to apply for sanction to borrow £189,026 for construction of additional offices in Earl Street.

Dorking and Horley R.D.C. Plans approved for construction of 32 houses at Abinger Common.

Durham. Erection of Birtley Brown's Buildings and Hartlepool West View county primary schools. County Architect's office, Court Lane, Durham.

Edinburgh. Dean of Guild Court has approved plans for reconstruction and additions to factory of Duncan Flockhart and Co. Ltd.

Ennis (Clare). U.D.C. to erect 200 houses.

Eton (Bucks) U.D.C. Tenders to be invited for erection of 14 houses and 20 flats.

Gateshead. Erection of Hindley Hall (residential school), Stocksfield Technical College, and Southend Rd. schools, Sheriff Hill. H. J. Cook, chief architect, Municipal Offices, Swinburne St.

Harwich T.C. Great Eastern Hotel to be converted into council chamber, courtroom and municipal offices. Estimated cost, including lighting, is £5,291.

Hollingbourne (Kent) R.D.C. Erection of 20 houses at Langley Heath, 14 at Stockbury, 8 at Chart Sutton and 6 at Platts Heath, Langley.

Hull. Erection of 60 flats in Anlaby Rd. City Architect's Dept., Guildhall.

Irvine (Ayr). Dean of Guild Court has approved construction of 42 houses at estimated cost of £50,000.

Lincoln. Erection of 54 houses on Hartsholme estate. City Architect, Stamp End.

Longbenton U.D.C. Erection of 48 houses on the Crossley estate. Surveyor is A. E. Sweetman.

Milford Haven (Pembs) U.D.C. Erection of 14 houses at Harbour Way and 28 houses at St. Lawrence Hill. Engineer and Surveyor, Town Hall.

Newport (I.o.W.) T.C. It is proposed to build 44 houses and 16 flats in blocks of four on the Pan estate.

Newry (Down). N. Ireland Housing Trust proposes to erect 150 houses at Rooney's Meadows.

Newton Abbot U.D.C. Erection of 42 houses on the Buckland estate. Apply to Surveyor's Office, 18 Devon Square.

Norfolk. Following school building programme has been approved: Methwold secondary modern school, £135,400; Diss boys' secondary modern, £97,100; and first stage of Diss girls' secondary modern, £57,100.

Northumberland. First stage in construction of new Technical College at Ashington. County Architect, County Hall, Newcastle-on-Tyne.

Nottingham. Erection of secondary school at Bilborough. R. M. Finch, City Engineer and Surveyor, The Guildhall.

Plymouth. It is anticipated that tenders will be invited shortly for the City's summer illuminations scheme.

Renfrew. C.C. proposes to build 76 houses at Neilston, 50 at Elderslie, 46 at Busby, 32 at Bishopton, and 20 each at Ralston and Inverkip.

Rochester. Plans approved for erection of 68 houses on St. William's Way estate and 22 on Watling St. estate.

Southport T.C. Decorative lighting schemes are in hand for Nevill St., Scarisbrick Ave., Coronation Walk, The Pier, and Marine Drive Bridge.

South Shields T.C. Tenders to be invited shortly for erection of another 250 houses at Simonside.

Stamford. Construction of 56 houses and a shop on Drift Rd. estate. Apply to Town Clerk, Town Hall.

Stoke Newington. Approval received for construction of 45 flats on Burma Mews Green Lanes site.

Surbiton T.C. Erection of 132 flats on Chessington Court estate.

OVERSEAS

Canada. Enquiry has been received for sources of supply of a diesel-driven auxiliary lighting unit, 50 kVA, 2,300 V, complete with alternator and exciter, panel boards and controls, for use in hospitals. Equipment required by Mr. M. B. Rosen, manager of N.W. Electric Co., 1532 11th Ave., Regina, Saskatchewan, to whom replies should be sent with copy to Mr. W. J. Hansen, director, Trade and Marketing Services, Regina.

France. Frigibel S.A.R.L., 14 Rue Duffour-Dubergier, Bordeaux, are anxious to contact U.K. manufacturers of compressors and electric motors for industrial and commercial cold storage rooms.

New Zealand. J. Russell Hancock Ltd., P.O. Box 242, Te Aro, Wellington, C.2, wish to contact U.K. manufacturers of sealed condensing units for domestic refrigerators, small refrigeration compressors, small electric motors, tools for refrigeration trade and accessories, controls and general equipment.

Peru. Senores Carlos Nunez Melgar y Hermano, of Casilla 289, Arequipa, is anxious to contact U.K. manufacturers of electric pocket torches and accessories. Interested firms should communicate direct, sending illustrated leaflets and price lists.

MEETINGS TO NOTE

THURSDAY, JAN. 18

ELECT. POWER ENGRS. ASSOC. (Midland Tech. Group).—"Supervisory Control." Elect. Bd. Showrooms, Darlington St., Wolverhampton, 7 p.m.

I.E.S. (Gloucester and Cheltenham Centre).—"Lighting of Architecture." G. Grenfell Baines. Cadena Cafe, High St., Cheltenham, 6.30 p.m.

I.E.E. (London Utilisation Section). — "Electrically Interlocked Guards on Machines." W. Fordham Cooper. Savoy Place, W.C.2, 5.30 p.m.

FRIDAY, JAN. 19

MANCHESTER ASSOC. OF ENGRS.—"Electrical Aspects of Manchester—Sheffield Electrification Scheme." A. G. Hopking; "Mechanical Design and Construction of Manchester-Sheffield - Wath Electrification Scheme." H. O. Hinchliffe. Engrs. Club, Albert Sq., 6.45 p.m.

JNR. INSTN. OF ENGRS.—"Notes on Diesel Locomotives for Mines." A. O. Ellison. 39 Victoria St., S.W.1, 6.30 p.m.

SATURDAY, JAN. 20

A.S.E.E. (Oxford Branch).—Lecture by J. L. Taylor. Title not known. Southern Elect. Board, George St., 3 p.m.

MONDAY, JAN. 22

I.E.E. (London Radio Section).—Discussion on "How Reliable is a Radio Valve?" Savoy Place, W.C.2.

I.E.E. (Reading).—"Trends of Development in Radio Communication." Prof. Willis Jackson. Gt. Western Hotel, 7 p.m.

I.E.E. (Merseyside and N. Wales Centre),—"Control of Hydro-Electric Plant." A. C. H. Frost and W. Brittlebank. Liverpool Royal Instn., Colquitt St., 6.30 p.m.

I.E.E. (S. Midland Centre).—"Notes on Electrical Installations in large Chemical Factories." D. B. Hogg. James Watt Memorial Inst., Gt. Charles St., Birmingham, 6 p.m.

I.E.E. (Western Utilisation Group). "Evolution of the Lighting Art." J. W. T. Walsh. Electricity House, Colston Ave., Bristol, 6 p.m.

A.S.E.E. (Leeds Branch).—"Heating and Ventilating of Factories and Public Buildings." L. Copeland Watts, Y.M.C.A. Buildings, Albion St., 7.15 p.m.

TUESDAY, JAN. 23

I.E.E. (E. Midland Centre).—"Design on Power Transformers to Withstand Surges due to Lightning." A. T. Chadwick, J. M. Ferguson, D. H. Ryder and G. F. Stearn. Loughborough College, 6.30 p.m.

I.E.E. (N. Midland Utilisation Group).—"Notes on Electrical Installations in large Chemical Factories." D. B. Hogg. Lighting Service Bureau, 24 Aire St., Leeds, 6.30 p.m.

I.E.E. (Scottish Centre).—"Performance of the British Grid System in Thunderstorms." J. S. Forrest. Instn. of Engineers and Shipbuilders, Elmbank Crescent, Glasgow, 7 p.m.

WEDNESDAY, JAN. 24

I.E.E. (London Supply Section).—"Planning of an Electricity Board's Distribution System." G. O. McLean. Savoy Place, W.C.2, 5.30 p.m.

I.E.E. (N. Lancs. Sub-centre).—"Some Operating Experiences with High Pressure Steam Power Plant." W. N. C. Clinch. N.W.E.B., North Rd., Lancaster, 7 p.m.

I.E.E. (Southern Centre).—"Design and Operation of a 30-M.-V. Synchrotron." D. W. Fry, J. Dain, H. H. H. Watson, H. E. Payne. Technical College, Brighton, 6.30 p.m.

I.E.E. (N.W. Radio Group).—"Use of Saturable Reactors as Discharge Devices for Pulse Generators." W. S. Melville. Engineers' Club, Albert Sq., Manchester. 6.30 p.m.

A.S.E.E. (Coventry Branch).—"Electrical Accidents." H. Midgley. Coventry Tech. College, The Butts, 7.15 p.m.

THURSDAY, JAN. 25

A.S.E.E. (Luton Branch).—"Light, Vision and Lighting." B. H. Gurr. George Hotel, George St., 8 p.m.

I.E.S. (Nottingham Centre).—"Textile Lighting." T. S. Jones. Gas Showrooms, Parliament St., 5.30 p.m.

I.E.S. (Bradford Group).—"Light, Colour and the Stage." E. Faraday. Yorks Elect. Board, Sunbridge Rd., 7.30 p.m.

SATURDAY, JAN. 27

I.E.E. (N. Midland Centre).—Discussion "The M.K.S. System." College of Technology, Cookridge St., Leeds 2, 10 a.m.

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London, W.C.2.

Shaw Electric Welding Co., Ltd., 15 Redcliffe Av., Cardiff. Cap.: £500. Dirs.: W. A. Shaw and Mrs. E. M. Shaw.

Wilmas (Electrical) Ltd., 86 Elthorne Rd., Holloway, N.19. To take over business of electrical specialists formerly carried on by A. Lomas, E. Wilson and H. Varani, as "T. and A. Electrical Specialists" at Holloway, N.19. Cap.: £100. Dirs.: Mrs. E. Lomas, Mrs. M. Wilson, H. L. Varani and Mrs. I. Varani.

Lancashire Dynamo and Crypto (Mfg.) Ltd., 94 Petty France, Westminster, S.W.1. To acquire a four-fifths share in the business of mechanical, electrical and hydraulic engineers, manufacturers of and dealers in machinery, toolmakers, etc., carried on by Lancashire Dynamo Holdings, Ltd., and to carry on the partnership with the Lancashire Dynamo Holdings, Ltd. In the event of the determination of the partnership to acquire the one-fifth share of Lancashire Dynamo Holdings, Ltd., or to sell the four-fifths share of this company, as provided for in a deed of partnership. Cap.: £100,000. Dirs.: H. W. Bosworth, F. H. Shroeder, D. C. Lorkin and A. W. A. Dick.

B.C. Electrical Techniques Ltd., 50 Islington Park St. Islington, N.1. Cap.: £500. Dirs.: J. D. Stalker and D. P. Joyce.

Con-Electric Ltd., Prospect House, Main Rd., Oldham. To acquire any patents, brevets d'invention, and carry on business of electricians, mechanical engineers, etc. Cap.: £5,000. Dirs.: W. S. Earle, J. W. Woods, J. Holmes, T. Wilkinson, A. Lee and G. Dew.

Stevenage Switches Ltd. Manufacturers of and dealers in electric, electronic and scientific instruments and component parts, etc. Cap.: £100. Dirs.: P. L. Wilde, Copmanhurst, London Rd., Stevenage, Herts; I. C. M. Worsfold, W. H. T. Hayward, L. T. Taylor, A. P. G. Amos and C. Wallis.

T. and A. Nixon Ltd., 409 Stockport Road, Timperley, Ches. Electrical engineers, etc. Cap.: £3,000. Dirs.: W. A. Swaithes and Elsie Swaithes.

Bernard Berrie (Newcastle) Ltd., 39-43 Corporation St., Newcastle-on-Tyne 1. To take over business of an electrical contractor carried on at Corporation St., Newcastle-on-Tyne, by Bernard Berrie. Cap.: £3,000. Dirs.: B. A. Berrie and Mrs. D. Berrie.

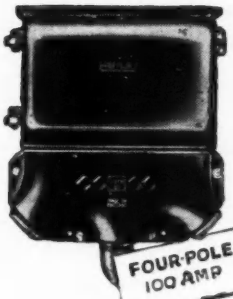
Phillips and Co. (Flore) Ltd. To take over business of an electrical engineer carried on at Flore, Northants, by Lewis S. Phillips. Cap.: £2,500. Dirs.: W. H. Hamilton, Vine House, Flore, Northants; L. W. Phillips and L. S. Phillips.

Wholesale Electro (Bradford) Ltd. Manufacturers of and dealers in dynamos, motors, etc. Cap.: £10,000. Dirs.: H. Beevers, Branch Cottage, Birchencliffe, Huddersfield; A. Buckley and E. Wilkes.

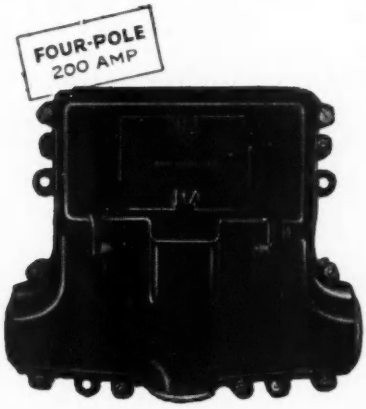
HENLEY

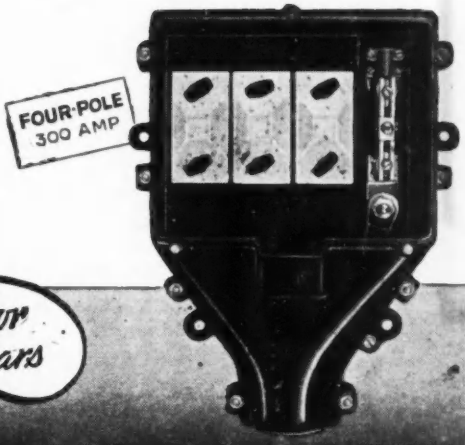
HEAVY DUTY 100-500 AMP

IRONCLAD SERVICE FUSES



HENLEY Heavy Duty Ironclad Service Fuses, suitable for Henley Wedge Type Cartridge Fuse-links, embody all the essential features necessary to ensure simplicity in installation and reliability in service. Only typical boxes are illustrated ; full details of the range are given in Catalogue 38, available on request.



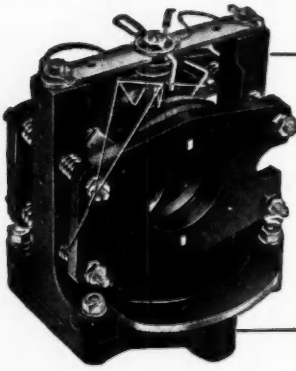


W.T. HENLEY'S TELEGRAPH WORKS CO., LTD., 51-53 HATTON GARDEN, LONDON, E.C.1.

FEATURES OF WESTON SUPERIORITY

Weston
DYNAMOMETER SUB-STANDARD INSTRUMENTS

This latest development of the well-known 'Weston' sub-standard Wattmeter is made in three models, each of high-grade dynamometer type, designed for a wide range of precision measurements. The standard series is particularly suitable for meter standardisation and for use as a transfer standard between A.C. and D.C. circuits. Type 2 is recommended for low power factor circuits and Type 3 for higher power frequencies. Similar in size and design, each is housed in a lightweight Bakelite case, with easy reading 6″ scale, knife-edge pointer and anti-parallax mirror. The moving element is fitted with spring-loaded jewels, double magnetic shielding is employed and each instrument carries a certificate of individual performance and guarantee of accuracy to 0.25%. Ample voltage and current ranges are available by simple switching which can be safely applied when the instrument is on load. Model S67 (as illustrated). Size 11″ × 9¼″ × 6⅜″. Weight 10 lbs. (approx.)



EXTREME RIGIDITY. A unique feature of these 'Weston' models is the self-contained assembly independent of the casing, thus ensuring extreme rigidity. The whole instrument is housed as one complete unit in an attractive Bakelite case with leather carrying strap and detachable cover. Ample shielding and the absence of metal parts eliminate errors due to external magnetic fields and eddy currents.

SANGAMO WESTON LIMITED

ENFIELD, MIDDLESEX.

Telephone : Enfield 3434 (6 lines) & 1242 (4 lines) - - Telegrams : Sanwest, Enfield

BRANCHES: GLASGOW, MANCHESTER, NEWCASTLE-ON-TYNE, LEEDS, WOLVERHAMPTON, BRISTOL, LIVERPOOL, NOTTINGHAM, SOUTHAMPTON, BRIGHTON

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CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WANTED · FOR SALE WORK WANTED

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia St., W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 35s. per inch, and all other classified advertisements at 2s. 6d. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

TENDERS INVITED

METROPOLITAN WATER BOARD

MANUFACTURE, DELIVERY, ERECTION AND SETTING TO WORK OF (A) 11,000-VOLT AND 415-VOLT SWITCHGEAR AND MOTOR CONTROL DESKS, AND (B) SIX TRANSFORMERS AT THE BOARD'S CHINGFORD SOUTH PUMPING STATION

TENDERS are invited for the above installation. Documents may be inspected at the Board's offices and tender forms may be obtained from the Chief Engineer on production of an official receipt for one guinea, which sum shall be deposited with the Board's Treasurer and Comptroller and will be returned on receipt of a bona fide tender or the return of the documents. Cheques must be made payable to the Metropolitan Water Board and not to individuals.

Tenders on the prescribed form, enclosed in sealed envelopes, addressed to the undersigned and endorsed "Tender for Electrical Equipment, Chingford South," must be delivered at the Offices of the Board (Room 122) not later than 12 noon on Wednesday, February 28, 1951.

The Board do not bind themselves to accept the lowest or any tender.

W. S. CHEVALIER,
Clerk of the Board.

Offices of the Board,
New River Head, Rosebery Avenue, E.C.1. (H 381)

SOUTHERN ELECTRICITY BOARD

No. 1 (Southall) Sub-Area

HESTON DISTRICT
TENDERS FOR CHANGE-OVER OF WIRELESS EQUIPMENT

TENDERS are invited for the conversion, alteration or adjustment of wireless equipment in the Wimpey Estate Area of the Heston District owing to the change-over of supply from direct current 240/480 V, 3-wire, to single-phase alternating current, 50 c.s, 240 V.

Schedule of apparatus and form of tender may be obtained on application to Mr. S. H. Fowles, M.I.E.E., M.I.Mech.E., M.Inst.B.E., District Manager, 11 Staines Road, Hounslow, Middlesex.

Tenders, in plain sealed envelopes endorsed "Tenders for Wireless Apparatus (Wimpey Estate)," must be delivered to the undersigned not later than noon on February 2, 1951.

The Board do not bind themselves to accept the lowest or any tender, but reserve the right to accept the whole of any tender or part thereof.

The change-over will not be less than one hundred wireless sets per week.

E. C. T. OLDCORN,
Sub-Area Manager.

No. 1 (Southall) Sub-Area,
26 Windmill Lane,
Southall, Middlesex.
January 10, 1951. (H 387)

WORSBOROUGH URBAN DISTRICT COUNCIL

TENDERS are invited from specialist firms for the provision and erection of #4 lamp columns giving 25 ft mounting, together with 140 watt sodium discharge lamp lanterns, etc. Specifications and Bills of Quantities can be obtained from the undersigned and plans inspected at the Council Offices, Saville House, Worsborough Bridge, during normal office hours. Tenders, endorsed "Street Lighting," must be received not later than 10 a.m. on Monday, February 26, 1951.

HENRY C. HAND,
Clerk of the Council.

Council Offices,
Saville House,
Worsborough Bridge.
January 9, 1951. (H 369)

BINGLEY URBAN DISTRICT COUNCIL

INSTALLATION OF LIGHTING ON TRUNK ROAD IN BINGLEY, BETWEEN THE KEIGHLEY BOUNDARY AND CROSSFLATTS

TENDERS are invited for the installation of lighting system of 400 W fluorescent mercury lighting units on trunk route A.650 in Bingley for a length of approx. half-mile, the columns for which will be supplied by the Council.

Form of Tender, specification, etc., may be obtained from the undersigned.

Plans may be inspected at the office of the Council's Surveyor, Town Hall, Bingley, during normal office hours.

Sealed Tenders endorsed "Tender for Lighting—Crossflatts" should be delivered to the undersigned on or before February 2, 1951.

The Council does not bind itself to accept the lowest or any tender.

F. M. DUNWELL,
Clerk of the Council.

Town Hall, Bingley.
January 12, 1951. (H 340)

BOROUGH OF SWINTON & PENDLEBURY

ERECTION OF 100 HOUSES, CLIFTON ESTATE

TENDERS are invited for the wiring and supply of electrical fittings to the above houses now in course of construction.

Specifications and Form of Tender can be obtained from and drawings inspected at the offices of the Borough Engineer and Surveyor, Town Hall, Swinton, Lancashire, during working hours.

Tenders, in sealed envelopes provided for the purpose, must be returned to reach me not later than the first post on Saturday, February 3, 1951.

VINCENT COLLINGE,
Town Clerk.

Town Hall, Swinton, Lancs. (H 382)

APPOINTMENTS VACANT

BRITISH ELECTRICITY AUTHORITY

Yorkshire Division

APPOINTMENT OF POWER STATION SUPERINTENDENT—BRADFORD POWER STATION

APPLICATIONS are invited from qualified engineers for the position of Power Station Superintendent at Bradford Power Station. The station has a capacity of 125 MW.

Applicants should have had a wide experience in the operation and maintenance of large modern power station plant, and have held a position of responsibility involving the control of technical and administrative staff.

Preference will be given to engineers who are Corporate Members of the Institution of Electrical Engineers and/or the Institution of Mechanical Engineers, or who hold the necessary qualifications for membership.

Conditions of service and salary will be in accordance with the National Joint Board Agreement, Schedule A, Class "G," Grade 1, £1,069 to £1,119 per annum. The appointment will be subject to the provisions of the Authority's Superannuation Scheme.

Forms of application may be obtained from the Divisional Secretary, British Electricity Authority, Yorkshire Division, British Electricity House, St. Mary's Road, Leeds 7, to whom completed forms should be returned within 14 days of the appearance of this advertisement. Envelopes to be endorsed "Power Station Superintendent—Bradford."

G. A. VOWLES,
Divisional Controller.
(H 371)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments on the Engineering Staff of the Board's No. 2 Sub-Area:—

(1) SECTION ENGINEER (two posts), Warrington District. Salary £625 to £643 per annum. Grade 7, Class "F."

(2) ASSISTANT SECTION ENGINEER, Warrington District. Salary £538 to £560 per annum. Grade 9, Class "F."

(3) ASSISTANT SECTION ENGINEER, St. Helens District. Salary £538 to £560 per annum. Grade 9, Class "F."

(4) INSTALLATION INSPECTION ENGINEER, Warrington District. Salary £510 to £530 per annum. Grade 10, Class "F."

The conditions of service will be those of the National Joint Board Agreement.

Applicants for posts (1) should have the technical qualifications necessary to enable them to become Chartered Electrical Engineers, and should essentially have previous experience in all branches of work associated with the distribution of electricity.

In posts (2), (3) and (4), possession of the Higher National Certificate would be an advantage, and in posts (2) and (3), experience in h.t. and l.t. overhead and underground distribution work would be an added advantage.

The appointments are superannuable and subject to a medical examination.

Forms of application, obtainable from the Manager, No. 2 Sub-Area of the Board, Sandiway House, near Northwich, Cheshire, should be completed and returned to him not later than February 1, 1951.

JAMES RANKIN,
Secretary.
(H 372)

BRITISH ELECTRICITY AUTHORITY

Chief Engineer's Department, London

SENIOR DRAUGHTSMEN
DRAUGHTSMEN
FEMALE TRACERS

APPLICATIONS are invited for the following vacancies in the Drawing Office at Headquarters in London:—

Senior Draughtsmen and Draughtsmen.—Candidates should be experienced in one of the following:—(a) Layout of 132 kV sub-stations; (b) Preparation of schematic and protection diagrams for 132 kV sub-stations; (c) R.C. structures (and/or light structural steel work) and light concrete foundations; (d) Single storey industrial buildings; (e) Preparation of maps and cartography.

The salaries will be in accordance with age and experience within the following provisional salary ranges:—Senior Draughtsmen, £500 to £600 p.a.; Draughtsmen, £312 p.a. at 21, £468 p.a. at 25, rising to a maximum of £500 p.a. including London Allowance.

Female Tracers.—Candidates should preferably have had experience in any of the above work. N.J.C. salary scale, £212 p.a. at 21, £278 p.a. at 26, rising to a maximum of £338 p.a., including London Allowance.

All the appointments are superannuable.

Application forms may be obtained from the Secretary's Office (Establishments), Application Section, British Electricity Authority, British Electricity House, Great Portland Street, London W.1, and should be completed and returned to D. Moffat, Director of Establishments, not later than February 2, 1951.

Please quote reference AE/125. (H 361)

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the following appointment:—

DEPUTY STATION SUPERINTENDENT—
Little Barford Generating Station

Salary in accordance with the revised N.J.B. Agreement, Schedule A, Grade 3, Class "G" (£885 to £927 per annum).

Applicants should have had a good technical education, practical experience in the operation, maintenance and administration of a large generating station, and should preferably be Corporate members of one of the recognised Engineering Institutions.

The successful applicant will be expected to reside within a reasonable distance of the generating station.

The appointment will be superannuable in accordance with the British Electricity Authority and Area Boards' Superannuation Scheme.

Forms of application may be obtained from the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, Southgate, N.14, to whom completed forms should be sent to arrive not later than January 31, 1951. Envelopes should be endorsed "Deputy Station Superintendent—Little Barford."

W. N. C. CLINCH,
Controller.

Northmet House,
Southgate, N.14. (H 374)

BRITISH ELECTRICITY AUTHORITY

Yorkshire Division

APPLICATIONS are invited for the following appointments in the Transmission Department.

(a) THIRD ASSISTANT ENGINEER (MAINTENANCE) at Divisional Headquarters.

Applicants should have received sound technical education and Graduate Membership of the Institution of Electrical Engineers or exempting qualifications will be an advantage. Practical experience of the maintenance and operation of a 132 kV transmission system is essential.

Salary in accordance with National Joint Board Agreement, Schedule "C," Grade 5, £579-£710 p.a., rising ultimately to £776 p.a.

(b) ASSISTANT SECTION ENGINEERS (two vacancies).

A sound technical education is essential and the possession of technical qualifications will be an advantage. Practical experience of the maintenance and operation of high-voltage apparatus is necessary.

Salary in accordance with National Joint Board Agreement, Schedule "C," Grade 6, £516-£647 p.a., rising ultimately to £707 p.a.

(c) GENERAL ASSISTANT ENGINEERS (two vacancies).

Applicants should have received a sound technical education and the possession of technical qualifications will be an advantage. Experience in the construction and/or maintenance of high-voltage apparatus is necessary.

Salary in accordance with the National Joint Board Agreement, Schedule "C," Grade 8, £437-£569 p.a., rising ultimately to £622 p.a.

The appointments will be subject to the conditions of service as agreed by the National Joint Board and will be superannuable under the Authority's Scheme.

Forms of application may be obtained from the Divisional Secretary, British Electricity Authority, Yorkshire Division, British Electricity House, St. Mary's Road, Leeds 7, to whom completed forms should be returned within fourteen days of the appearance of this advertisement. Envelopes to be endorsed with the title of the position applied for.

G. A. VOWLES,
Divisional Controller.
(H 343)

MIDLANDS ELECTRICITY BOARD

Wolverhampton and District Sub-Area

APPOINTMENT OF FIRST ASSISTANT DISTRICT CONSUMERS' ENGINEER

APPLICATIONS are invited for the above post in the Walsall District of the Wolverhampton and District Sub-Area. Applicants should possess a sound technical training and have a wide practical experience of industrial, commercial and domestic installations and their electrical requirements. The duties will include advice on utilisation, negotiations with consumers, preparation of estimates, etc., planning of contracting work and maintenance and consumer service. Appropriate technical qualifications will be considered an advantage.

Conditions of service according to the N.J.B. Agreement and salary as Class "F," Grade 6—£660 per annum.

Applications, stating age, present salary, full particulars of qualifications, experience and present position, should be endorsed "Assistant Consumers' Engineer, Walsall," and forwarded within fourteen days to: Sub-Area Manager, Midlands Electricity Board, 83 Darlington Street, Wolverhampton.

A. STEPHENS,
Secretary.
January 8, 1951. (H 360)

SOUTHERN ELECTRICITY BOARD

No. 3 (Portsmouth) Sub-Area

NOTICE OF STAFF VACANCY NO. Z.245

POST. ASSISTANT ENGINEER (PLANNING), Portsmouth District.

Qualifications : Candidates should have experience in and ability to prepare proposals and estimates for extensions of h.v. and l.v. networks and sub-stations, and to deal with preliminary work prior to construction. Preference will be given to applicants holding a University degree or equivalent qualification. The appointment will involve standby duties.

Salary and conditions : The provisional salary will be £525 per annum, subject to adjustment by the appropriate negotiating machinery, with N.J.B. conditions of service. The successful applicant will, subject to certain conditions, be required to contribute to the B.E.A. and Area Boards' Superannuation Scheme, membership of which is compulsory.

Applications : On forms to be obtained from the Sub-Area Secretary, Lower Drayton Lane, Cosham, Portsmouth, and returned to him in envelopes endorsed "Assistant Engineer (Planning), Portsmouth" by not later than Saturday, February 3, 1951. (H 400)

SOUTH EASTERN ELECTRICITY BOARD

Croydon District

ASSISTANT DISTRICT COMMERCIAL ENGINEER

SALARY of £565 per annum under Class "F," Grade 9 of the N.J.B. Schedule plus London Weighting. Superannuation will be arranged. Applicants should be qualified engineers. Duties will include technical and administrative control of contracting department. Experience in supply industry, and in controlling showrooms an advantage.

Applications, giving two referees, must reach A. E. Hawkins, Esq., B.Sc. (Eng.), A.M.I.E.E., Croydon Manager, South Eastern Electricity Board, Electric House, Wellealey Road, Croydon, by January 29, 1951.

Folkestone District

GENERAL ASSISTANT ENGINEER

Salary of £524 to £542 per annum under N.J.B. Schedule, Class "D," Grade 8. Superannuation will be arranged. Applicants must have experience of distribution work including the construction, maintenance and operation of h.v. and l.v. cables, a.c. and d.c. switchgear, transformers, overhead lines, substations, protective gear, etc., and must possess Higher National Certificate or equivalent qualification. The appointment will involve standby duties.

Applications, giving two referees, must reach P. V. Gurr, Esq., J.P., Folkestone Manager, South Eastern Electricity Board, York House, Cheriton Gardens, Folkestone, by January 29, 1951.

DISTRICT COMMERCIAL ENGINEER

The re-organised Tunbridge Wells district. (This incorporates the former districts of Tonbridge and East Grinstead and part Weald, approximately 200 sq. miles and 34,000 consumers).

Salary of £722 per annum under the N.J.B. Schedule, Class "E," Grade 4. Superannuation will be arranged. Applicants to be qualified engineers with experience in a large district commercial department, conversant with tariffs, showrooms, sales, commercial statistics, installation work and all aspects of service to domestic, commercial and agricultural consumers. The person appointed will be responsible for the department. Accommodation may be available for the successful applicant.

Applications, giving two referees, must reach T. W. Dann, M.Eng., M.I.E.E., Tunbridge Wells Manager, South Eastern Electricity Board, Town Hall, Tunbridge Wells, by January 29, 1951

A. L. BURNELL,
Secretary.

January, 1951. (H 390)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

APPOINTMENT OF FIRST ASSISTANT DISTRICT ENGINEER

APPLICATIONS are invited for the appointment of First Assistant District Engineer (Senior Section Engineer), Southport District, No. 1 Sub-Area, at a salary of £662 per annum in accordance with Grade 5, Classification "E" of the National Joint Board Agreement.

Applicants should possess sound experience in the engineering aspects of electricity supply including construction, operation and maintenance of high voltage systems, and preference will be given to those who are Chartered Electrical Engineers. The appointment will be superannuable and subject to medical examination.

Application forms, obtainable by written request from the Manager, No. 1 Sub-Area, Merseyside and North Wales Electricity Board, 24 Hatton Garden, Liverpool 3, should be completed and returned so as to be received by him not later than February 1, 1951.

JAMES RANKIN,
Secretary.
(H 396)

BRITISH ELECTRICITY AUTHORITY

Secretary's Department, Headquarters, London

SENIOR WAYLEAVE OFFICER

APPLICATIONS are invited for the post of a Senior Wayleave Officer in the Secretary's Department at the Authority's Headquarters in London, to act as an Assistant to the Chief Wayleave Officer. Applicants should have had wide experience of wayleave work in the field and of the general correspondence and negotiations which the work involves with statutory bodies, local authorities, owners and occupiers, and be familiar with the relevant legislation. The salary for the appointment, which is superannuable, will be within Grade 8 of the National Joint Council Salary Agreement, i.e., £835, rising by annual increments of £35 to £940 per annum inclusive of London Allowance.

Applications, stating age, present salary and giving full details of qualifications and experience should be forwarded to D. Moffat, Director of Establishments, British Electricity Authority, British Electricity House, Great Portland Street, London W.1, to be received not later than February 2, 1951. Please quote reference AE 127. (H 397)

WAR DEPARTMENT

APPLICATIONS are invited for the following vacancies in the Fortifications and Works Directorate at Chessington, Surrey:—

Applicants must have reached a technical standard of not less than Ordinary National Certificate:—

(1) LEADING DRAUGHTSMAN (Electrical)

Must have experience in preparation of distribution and transmission diagrams and drawings, sub-station and main switchboard layouts, and knowledge of latest Regulations for Electrical Equipment of Buildings and Post-War Order of Practice.

(2) DRAUGHTSMAN (Electrical)

Must have good knowledge and experience of Electrical Engineering.

Candidates for all posts should be under 50 years of age.

Salaries for the posts are:—Post 1: £470 to £595 per annum; Post 2: £283 to £495 per annum.

Starting salary will be fixed according to age, qualifications and experience. Annual increases are payable, subject to satisfactory service.

The posts are temporary, but most of them have long-term possibilities and open competitions are held periodically to fill established posts.

The work is varied and interesting and good canteen facilities exist.

Apply, in writing only, stating age, nationality and full details of qualifications and experience to The War Office, (C.5(A)), Room 504, Hotel Victoria, Northumberland Avenue, London W.C.2. (H 375)

SOUTH WALES ELECTRICITY BOARD

APPLICATIONS are invited for the position of FIRST ASSISTANT DISTRICT ENGINEER in District 224 (Pontardawe) in the West Central Sub-Area of the Board.

Applicants should have experience in the construction, operation and maintenance of substations and underground and overhead high and low voltage mains in urban and rural areas. Preference will be given to applicants who possess an Engineering Degree of a British University, the Higher National Certificate or its equivalent, or have passed the Graduateship Examination of the Institution of Electrical Engineers. The salary for the position will be in accordance with Class "D," Grade 4 (£667/£685/£703) of the National Joint Board Schedule for the Electricity Supply Industry.

Applications, stating age, present position, present salary, qualifications and experience, and whether married or single, together with the names and addresses of three referees, should be addressed to the Secretary (Establishments), The South Wales Electricity Board, St. Mellons, Cardiff, so as to reach him not later than January 31, 1951.

D. C. DODDS,
Secretary.
(H 392)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

GENERAL ASSISTANT ENGINEER

APPLICATIONS are invited for the appointment of GENERAL ASSISTANT ENGINEER in the No. 4/5 Sub-Area of the Board based on North Wales. Salary £458 to £476 per annum, Grade 13, Class "H," National Joint Board Agreement.

Applicants should have had experience in the laying out, erecting and setting to work of overhead and underground mains, mainly in rural areas, and the control of gangs engaged on such work. Possession of the Higher National Certificate in Electrical Engineering would be an advantage.

The appointment will be superannuable and subject to medical examination.

Application, on forms obtainable from the Manager, No. 4/5 Sub-Area, Electricity House, Rhostyllen, near Wrexham, should be completed and returned so as to be received not later than February 1, 1951.

JAMES RANKIN,
Secretary.
(H 373)

BRITISH ELECTRICITY AUTHORITY

North Western Division

No. 2 SUB DIVISION, KEARSLEY

APPLICATIONS are invited for the position of DRAUGHTSMAN at No. 2 Sub Division's Headquarters, Kearsley Generating Station, Stoneclough, near Manchester.

Candidates should have experience in machinery, pipe work, structural and general engineering drawing, and experience of Power Station work will be an advantage.

The salary for the post, which is superannuable, is provisional, pending negotiations with the appropriate body, and will be within the range £400 to £550 per annum.

Applications, giving age, details of education, training and experience, should be sent to the Establishment Officer, British Electricity Authority, Wilmslow Road, East Didsbury, Manchester 20, not later than January 27, 1951. (H 378)

NORTH WESTERN ELECTRICITY BOARD

No. 3 Sub-Area

APPOINTMENT OF SECOND ASSISTANT ENGINEER (SYSTEM PLANNING AND DESIGN)

APPLICATIONS are invited for the appointment of a Second Assistant Engineer in the System Planning and Design Section at No. 3 Sub-Area Headquarters, Union Street, Oldham.

The salary for the post will be in accordance with the Revised National Joint Board Agreement, Class "J," Grade 7, i.e. £736-£753-£770 per annum.

Candidates must have had a sound training in Electrical Engineering to Degree or Higher National Certificate standard and responsible experience in several of the following branches:—

(a) Planning and construction of 33 kV and lower voltage systems.
(b) Maintenance and operation of 33 kV and lower voltage systems.
(c) Substation design and construction.
(d) Application of protective gear.
(e) Planning and installation of telecommunication, supervisory and ripple control equipment.
(f) Preparation of specifications for distribution plant.

Applications, stating age and giving full details with relevant dates of training and experience, qualifications, present post and salary, should be received by E. Binns, Esq., M.I.Mech.E., A.M.I.E.E., Sub-Area Manager, The North Western Electricity Board, No. 3 Sub-Area Headquarters, Union Street, Oldham, not later than Saturday, January 27, 1951. (H 339)

SOUTH EAST SCOTLAND ELECTRICITY BOARD

THE Board invite applications for the position of GENERAL ASSISTANT ENGINEER in the Commercial Department at Area-Board Headquarters.

Applicants should have had a good general and technical education, and previous experience in the commercial activities of an electricity supply undertaking would be a recommendation. The duties will include compilation and analysis of statistical data, technical cost analysis and preparation of data for tariff purposes. The salary will be in accordance with the National Joint Board Revised Agreement, Grade 8, Class "AX BX," and will commence at a point within the range of £437 £586 per annum, depending upon qualifications and experience. The post is superannuable.

Applications, giving full details of training, qualifications, experience, age, present appointment and salary, and stating whether married or single, should be submitted to the Chief Commercial Officer, South East Scotland Electricity Board, 52 Melville Street, Edinburgh, within 14 days.

THOMAS J. MULLAN,
Secretary.
(H 398)

SOUTHERN ELECTRICITY BOARD

No. 3 (Portsmouth) Sub-Area

PORTSMOUTH DISTRICT

APPLICATIONS are invited for the post of OPERATOR AND MAINTENANCE ENGINEER (First Assistant):—

Qualifications: Candidates must have had wide experience in the operation and maintenance of distribution systems and substations at pressures up to 33 kV, together with experience in the control of staff and labour. They must possess recognised technical qualifications and preferably be Corporate Members of the I.E.E.

Salary and conditions of service: Salary in accordance with N.J.B. Class "F," Grade 5 (£711-£724-£737) with N.J.B. Conditions of Service. The successful candidate will be required to contribute to the B.E.A. and Area Boards' Superannuation Scheme if eligible.

Applications: On a standard form, obtainable from the Sub-Area Secretary, Lower Drayton Lane, Cosham, Portsmouth, and returned to him not later than ten days after the appearance of this notice.

F. W. KEMPTON,
Secretary.
(H 341)

SOUTH WALES ELECTRICITY BOARD

APPLICATIONS are invited for the position of DISTRICT ENGINEER in District 345 (Pontypridd and Caerphilly) in the Central Sub-Area of the Board.

Preference will be given to applicants who possess an Engineering Degree of a British University, the Higher National Certificate or its equivalent.

The salary for the position will be in accordance with Class "D," Grade 2 (£810 £825 £840) of the National Joint Board Agreement for the Electricity Supply Industry.

Applications, stating age, present position, present salary, qualifications and experience and whether married or single, together with the names and addresses of three referees, should be addressed to the Secretary (Establishments), The South Wales Electricity Board, St. Mellons, Cardiff, so as to reach him not later than January 27, 1951.

D. G. DODDS,
Secretary.
(H 391)

BRITISH ELECTRICITY AUTHORITY

Yorkshire Division

THIRD ASSISTANT ENGINEER (EFFICIENCY AND TESTING DEPARTMENT)

APPLICATIONS are invited for two posts at Divisional Headquarters, Leeds.

Duties will include assisting the Senior Assistant Engineer (Efficiency and Testing) in the testing of boilers, turbo-generators, cooling towers and power station auxiliaries, calculation of efficiencies, preparation of reports, etc. Applicants should be educated to the B.Sc. standard or equivalent, and preference will be given to candidates who have had experience in the operation of the above plant, particularly boiler house and combustion experience.

Conditions of service and salary will be in accordance with the National Joint Board Agreement, Schedule "C," Grade 5, £579-£710 p.a., rising ultimately to £776 p.a. The appointment will be subject to the provisions of the Authority's Superannuation Scheme.

Forms of application may be obtained from the Divisional Secretary, British Electricity Authority, Yorkshire Division, British Electricity House, St. Mary's Road, Leeds 7, to whom completed forms should be returned within 14 days of the appearance of this advertisement. Envelopes to be endorsed "Third Assistant Engineer (Efficiency and Testing)."

G. A. VOWLES,
Divisional Controller.
(H 342)

MIDLANDS ELECTRICITY BOARD

Shropshire and Herefordshire Sub-Area

APPOINTMENT OF ASSISTANT DISTRICT ENGINEER

APPLICATIONS are invited for the above position in the Wellington District of the Shropshire and Herefordshire Sub-Area.

Applicants must have had experience in all branches of distribution work, including erection, operation and maintenance of high and low voltage cables, overhead and underground mains, substations, etc. Appropriate technical qualifications will be considered an advantage.

Conditions of service will be in accordance with the National Joint Board Agreement, and the provisional salary will be Class "E," Grade 7, £579 £609 per annum.

Applications, stating age, present salary, full particulars of qualifications, experience, and present position should be forwarded within 14 days to Mr. W. Winwood, Manager, Shropshire and Herefordshire Sub-Area, Midlands Electricity Board, Spring Gardens, Ditherington, Shrewsbury.

A. STEPHENS,
Secretary.
January 10, 1951. (H 380)

BRITISH ELECTRICITY AUTHORITY

CROYDON "B" POWER STATION

(a) ASSISTANT SHIFT CHARGE ENGINEERS, experienced in operation of modern high-pressure power station plant essential. Preference given to those with P.F. experience.
(b) JUNIOR ENGINEERS (Control). Experience in operation of e.h.t. switchgear and parallel running of alternators essential.

Higher National Certificate preferable for both positions. N.J.B. conditions of service and salary: (a) Class "J," Grade 9, £678 6s. p.a.; (b) between Grades 18, £400, and 14, £485, including London Allowance.

Application forms obtainable from the Divisional Secretary, B.E.A., South Eastern Division, Lower Ham Road, Kingston-upon-Thames, to be returned by January 26, 1951. (H 377)

BRITISH ELECTRICITY AUTHORITY

South Eastern Division

JUNIOR ENGINEER, Control Room, Littlebrook Power Station, Dartford, Kent. Higher National Certificate standard education preferable. Experience necessary in operation of E.H.T. switchgear and parallel running of alternators. N.J.B. conditions and salary in accordance with Clause 35, commencing between Class "J," Grade 18 and 14, £375—£460 p.a. plus London Allowance.

Applications, on forms obtainable from Divisional Secretary, B.E.A., S.E. Division, Lower Ham Road, Kingston-upon-Thames, to be returned by January 26, 1951. (H 395)

ASSISTANT ELECTRICAL ENGINEER required for Iron and Steel Works. Applications, giving age, details of education, experience, positions held (with dates), and including photograph, should be submitted, together with salary required, to Box No. 2065, Electrical Times. (H 313)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

A FEW attractive vacancies for DRAUGHTSMEN exist at the Liverpool works of the English Electric Co. Ltd. The work is of an electro-mechanical nature, but any draughtsmen with experience in the design and detailing of mechanisms or welded fabrications, or, in fact, any kind of medium mechanical equipment will be considered. Excellent opportunities for advancement in this interesting field.—Please write, giving full details and quoting Ref. 135B, to Central Personnel Services, English Electric Co. Ltd., 24/30 Gillingham Street, London S.W.1. (H 239)

APPLICANTS are invited for the post of RESIDENT-ENGINEER to take charge of Contracts for Erection and Commissioning of hydro-electrical equipment in Portugal. Only engineers with substantial experience of large-scale overseas responsibility for this class of work will be considered. Contracts in Portugal will be of some years' duration, but on completion continued similar employment will probably be available at home or overseas.—Apply, giving full details and quoting Ref. 838 to Central Personnel Services, English Electric Co. Ltd., 24/30 Gillingham Street, London S.W.1. (H 238)

ASSISTANT ENGINEER required by large engineering organisation in East London area for Capacitor Design and Development. 21 to 25 years of age. Good opportunities for advancement. Degree or Higher National Certificate Electrical—Write, stating age and qualifications, to Box No. 2079, Electrical Times. (H 365)

CHIEF TRANSFORMER DESIGNER. Experienced in design of units of 10-15 MVA up to 132 kV, and with on-load tap changing and impulse work. Salary in accordance with qualifications and experience.—Apply, Technical Director, Bryce Electric Construction Co., Ltd., Kelvin Works, Hackbridge, Wallington, Surrey. (H 254)

DRAUGHTSMAN, familiar with light electrical mechanism or instruments and preferably with some circuit experience, required by Dowty Equipment Ltd., Arle Court, Cheltenham, for development work on aircraft controls. Age 21-25. Higher National Certificate preferred.—Write to Personnel Manager, stating age, experience and salary required. (H 303)

DRAUGHTSMEN. Britain's leading design consultants and contractors require urgently Senior Switchgear Draughtsmen, also Juniors to train as Switchgear Draughtsmen. Good salaries and prospects of advancement for suitable applicants. Pension scheme.—Write in confidence, quoting reference E.T., to John A. Smith Ltd., 24 Lichfield Street, Wolverhampton. (H 335)

ELECTRICAL ASSISTANT required with practical experience in electrical installation (contracting) work. Applicants should be aged 30-40 years and have had estimating and supervisory experience, minimum technical training to O.N.C. (Electrical). Duties will comprise the preparation of estimates, and working layout drawings for power and lighting systems. Permanent position with contributory pension scheme.—Applications, stating age, qualifications, experience and salary required, to Box No. 2085, Electrical Times. (H 383)

ELECTRICAL ENGINEER with experience of design of control gear for industrial and traction motors wanted for Sales Office of Resistor Manufacturer near London to handle enquiries and application design.—Please state age, salary and experience to Box No. 2041, Electrical Times. (H 226)

ELECTRICAL ENGINEER (Junior) for works engineer department, with experience in the preparation of schemes for lighting and installation of general electrical equipment. Higher National Certificate desirable. Salary according to age and experience.—Apply, Box No. 2043, Electrical Times. (H 247)

ELECTRICAL ENGINEER to be responsible for control gear testing and electrical maintenance in a small works in the Manchester district. Interesting variety of work with good prospects.—Box No. 2061, Electrical Times. (H 311)

ELECTRICAL ENGINEER. Imperial Chemical Industries Limited have a vacancy in their Billingham Division for an Electrical Engineer for maintenance and/or design work. Candidates must possess a university degree and have had practical training in electrical engineering.—Write, giving full details of qualifications and experience, to the Staff Manager, Imperial Chemical Industries Limited, Billingham Division, Billingham, Co. Durham. (H 347)

ELECTRICAL ENGINEER required for Far East as salesman for engineering supplies. Should hold Higher National Certificate, or equivalent. B.T.H. trained preferred. Age not over 30. Commencing salary £500-800 p.a. (according to age and experience) plus cost-of-living allowance. Passage and furnished accommodation provided. Provident fund; pension scheme.—Apply: Staff Secretary, The Borneo Co., Ltd., 143/9 Fenchurch St., E.C.3. (H 353)

ELECTRICAL ENGINEERING ASSISTANT with drawing office experience required for consulting engineers' office, for transmission and distribution works and, preferably, with knowledge of hydro-electric or steam-power station work.—Apply, in writing, stating age, qualifications and experience, to Strain and Robertson, 154 West George Street, Glasgow. (H 349)

ELECTRICAL/MECHANICAL INSPECTOR

An Electrical/Mechanical Inspector is required by a major British Oil Company for service in the Middle East. Applicants must have wide experience covering maintenance and inspection of installed plant associated with modern large generating stations with voltage range of 33 kV to 440 volts. Knowledge of flameproof switchgear an advantage. Possession of H.N.C. essential and qualifications up to A.M.I.E.E. desirable. Age limit 37 years. Attractive salary plus generous allowance in local currency designed to assist substantially in meeting cost of living, free passages, kit allowance, free medical attention, good leave arrangement, pension scheme.

Write, giving personal particulars, and details of qualifications and experience, quoting Dept. F.7, to Box 3291 at 191 Gresham House, London, E.C.2. (H 270p)

EXPERIENCED SENIOR DRAUGHTSMEN urgently required by a well-known manufacturer for employment in the Midland and London areas. Excellent opportunities for men experienced in switchgear layout and design. These are senior vacancies carrying salaries of up to £600 per annum, and good possibilities exist for the provision of accommodation in the Midland area for suitable married applicants.—Write, giving full details, quoting Ref. ADA, to Box No. 2037, Electrical Times. (H 224)

FERRANTI LIMITED invite applications for senior appointments of graduate engineers with industrial experience in the design of electricity meters. The posts to be filled carry senior responsibility with excellent prospects, generous salary and pension.—Application forms from the Staff Manager, Ferranti Limited, Hollinwood. Please quote reference M.E. (H 324)

FOREMEN required by the Southern Electricity Board, Engineering Department, Waterloo Road, Uxbridge. Applicants should possess a good experience in the erection, installation and maintenance of outdoor and indoor substation plant and equipment, operated at voltages up to 33,000 volts and the ability to control men. A knowledge of overhead lines and/or cable work and the ability to drive a vehicle would be considered an advantage. Rates of pay and conditions of service to be governed by the National Joint Industrial Council Agreement dated July 20, 1949. Applications, stating full details of qualifications, experience, age, etc., should be addressed to the Sub-Area Engineer, Southern Electricity Board, No. 1 (Southall) Sub-Area, Waterloo Road, Uxbridge, Middlesex, not later than January 31, 1951, commencing at 10.30 a.m. (H 389)

JUNIOR TECHNICAL ASSISTANT required for leading fluorescent lamp work. Education to ordinary or higher national certificate standard. Good opportunity of progress for energetic production-minded technician.—Apply: Personnel Manager, Thorn Electrical Industries, Ltd., Gt. Cambridge Road, Enfield. (H 348)

JUNIOR TEST ENGINEER for high voltage testing work. Age 20-25 years. Technical education to at least Ordinary National Certificate standard. Previous electrical testing experience necessary.—Write for interview, giving training and experience, to the Assistant Secretary, The Micanite & Insulators Co., Ltd., Empire Works, Blackhorse Lane, E.17. (H 363)

Applications are invited for the following positions, for which first-class Engineers are required:

ELECTRICAL CONTRACTING ESTIMATORS

Accustomed to large modern types of Industrial and Commercial Electrical Installations.

OUTSIDE PLANNING AND SUPERVISING ENGINEERS

For Electrical Contracts, having wide experience all types Electrical Installation.

COMPETENT JOURNEYMAN ELECTRICIANS

Fully Skilled Industrial — Domestic Installations.

Apply to

LEE, BEESLEY & CO., LTD.,
6, WARWICK ROW, COVENTRY

(H 334p)

IMPERIAL CHEMICAL INDUSTRIES LTD., Alkali Division, Northwich, Cheshire, has vacancy for ELECTRICAL DRAUGHTSMAN. Higher National (Electrical) or equivalent. Capable of making good layout drawings for industrial electrical equipment and distribution schemes. Salary according to age and experience. Housing available for certain applicants within three months after starting.—Applications, stating age, experience and qualifications to Staff Manager. (H 356)

MAJOR Oil Company require an ELECTRICAL ENGINEER for employment in U.K. with occasional visits overseas. Candidates should be Corporate Members of the Institute of Electrical Engineers, an engineering degree being an advantage. Age about 35 years. They should have a thorough works training and experience in a department covering construction, installation, operation and maintenance of an e.h.v. and l.v. power networks for a new project. Candidates should possess knowledge of modern U.K. methods of network control and system operation, also up-to-date maintenance experience of transformers, switchgear and associated equipment. Salary in accordance with age and qualifications.—Write, giving full details and quoting Department IR/50 to Box 6058 at 191, Gresham House, E.C.2. (H 388)

OIL Refinery Contractors require a qualified ENGINEER to be responsible for specifying and selecting all types of pumps, motors, turbines, compressors, etc., used in the refining industry. Applicants should have had past experience of such equipment, particularly application of process type centrifugal pumps in the petroleum industry.—Write fully, Foster Wheeler Ltd., 3 Ixworth Place, London S.W.3. (H 399)

PROMINENT Electrical Manufacturers require TECHNICAL ASSISTANT for administrative post in London area. Age about 30. Practical experience of lead-acid batteries including stationary types essential.—Write giving full particulars of age, education and experience, to Box No. 2075, Electrical Times. (H 357)

QUALIFIED ELECTRICAL ENGINEER, commercial experience essential, required for responsible permanent position Pakistan. Salary approximately £1,200 p.a. and appropriate expenses. Single man aged 30 to 35 preferred. Applicants must have sound knowledge theory and practice of power, transmission and distribution. Knowledge of line communication system an advantage. The post offers good prospects with old established company.—Apply Box No. 2081, Electrical Times. (H 366)

RESIDENT CONSTRUCTION ENGINEER required for Power Station Project in the United Kingdom. Applicants should have had extensive experience in the construction of large power plants and associated equipments, and should be corporate member of one of the engineering institutes or have similar qualification. Applications, stating age, experience, and salary required, should be addressed to the Secretary, Ewbank & Partners Ltd., 15 Grosvenor Place, London S.W.1. (H 364)

SALES REPRESENTATIVES (four) (a) Yorkshire, (b) Midlands, (c) South Wales, (d) South Coast, for well-known fluorescent cold cathode light fittings manufacturers. Progressive position for keen and energetic man with proved qualifications and connections.—Applications, stating age, experience, etc., will be treated in strict confidence, and should be addressed to Micramatic, Ltd., Wootton Mount, Bournemouth. (H 252)

SENIOR ELECTRICAL DRAUGHTSMEN required capable of designing, with minimum of supervision, electrical engineering installations for all types of buildings.—Reply, stating experience, age and salary required, to J. Stinton Jones and Partners, Consulting Engineers, 21 Gloucester Place, London W.1. (H 354)

TRANSFORMER DESIGNERS. Senior, experienced in design of units 10-15 MVA, with experience of on-load tap changing gear and preferably with some experience of impulse work on such units. Also Junior, with some experience. Salaries in accordance with qualifications and experience.—Apply, Technical Director, Bryce Electric Construction Co., Ltd., Kelvin Works, Hackbridge, Wallington, Surrey. (H 253)

WANTED by Public Company for Lower Burma—QUALIFIED ELECTRICAL/MECHANICAL ENGINEER with experience of hydro-electric and centrifugal pumping plants and workshop practice—single man preferred—furnished quarters, passage paid out and home—salary dependent upon experience plus cost of living allowance. Applications stating age, experience and salary required, with references and copies testimonials to Box F.Q.U., c/o 95 Bishopsgate, London E.C.2. (H 338)

APPOINTMENTS FILLED

RURAL Electrification Assistant, British Electrical Development Association which was advertised in Oct. 19 issue.

APPOINTMENTS WANTED

A CHARTERED ELECTRICAL ENGINEER, A.C.G.I., A.M.I.E.E., resident in London, desires change and seeks position of senior responsibility with scope for initiative. Sixteen years' first-class experience with leading manufacturers, home and abroad, in production, contracts, sales. Proved organising ability, experienced in general administration, supervision of staff, publicity, preparation and adjudication of comprehensive specifications and tenders.—Box No. 2051, Electrical Times. (H 282)

ADVERTISER, age 37, over 20 years' experience all branches, wishes to emigrate to Australia. Would be pleased to hear from British firms having vacancies in that country.—Box No. 2057, Electrical Times. (H 288)

A. M.I.E.E. (34) seeks suitable progressive appointment abroad, preferably in Malaya, Africa or South America. Previous industrial experience abroad.—Box No. 2089, Electrical Times. (H 385)

WORK WANTED

A.C. and d.c. Motor Rewinds and Repairs. Prompt service, fully guaranteed.—Edgware 8631 (4 lines). Service Electric Co., Ltd., Stanmore, Middx. (D 324)

ARMATURE SERVICE CO. LTD., Haddington Street, Hove (Tel. 32966), electrical engineers and winding specialists. Distance no object. (F 739)

BARREL PLATING CAPACITY AVAILABLE. Cadmium, copper, tin, and electro-galvanizing.—Packer and Son, Sion Place, Clifton, Bristol 8. Phone 38368. (H 336)

CASTINGS, Fisher Foundries, Ltd., Greet, Birmingham, have capacity for brass, gun metal and soft grey iron machine moulded repetition castings weighing 1-30 lb. Loose pattern work up to 3 cwt. Delivery by road to all parts. Tel.: B'ham, Victoria 0197. (H 268)

10/6 VAC. fields rewound; 19/6 vac. armatures rewound; 45/- complete rewind and overhaul vac. motors (3 to 7 days' service). Commutators and bearings extra. Also portable tools, etc. All motors from 1/20th to 200 h.p. rewound and reconditioned by J.B. Electric Ltd., 199 Manchester Road, Broadheath, Altrincham, Cheshire. (Tel.: Altrincham 2146.) (H 219)

WANTED

A.C./D.C. MOTORS, STARTERS, complete change-over installation, etc.—A.A. Electrical Co., Ltd., 67 Rothschild Road, Chiswick Park, W.4. Phone: Chiswick 5105. (A 20)

SCRAP ACCUMULATOR PLATES and Sediment wanted, any quantities. Also Storage Batteries purchased and dismantled.—Phone or write Elton Levy Co., Ltd., St. Ermin's (West Side), Caxton Street, London, S.W.1. Phone: WHItehall 9621/2/3. (A 3)

STEEL, ALUMINIUM BRASS and other non-ferrous sheets, strip, bars, off-cuts. Any quantity, gauge, size. Immediate payment.—Grades Sheared Metal Co., Ltd., Green Lane, Hounslow, Middlesex. Telephone: Feltham 3274. (H 368)

WANTED, ROTARY CONVERTERS, any size.—Universal, 221 City Road, London E.C.1. (A 16)

WANTED for prompt cash, ferrous and non-ferrous SCRAP; also plant for dismantling. Buyers of second-hand machinery and plant for re-use.—W. and H. Cooper, Ltd., 176 Brady Street, Bethnal Green, E.1. (A 1)

WANTED.—Large quantity of 4-in. outside diameter TUBES from the dismantling of old Babcock Water-tube Boilers. Best prices paid. Prepared to purchase Babcock and Wilcox Water-tube Boilers for dismantling.—Apply, giving full details, to Midland Iron and Hardware Co., Cradley Heath. (A 5)

WANTED, D.C. and A.C. ball-bearing MOTORS, MOTOR GENERATOR SETS, DYNAMOS and ALTERNATORS.—Full details to Britannia Manufacturing Co., Ltd., 22-26 Britannia Walk, London, N.1. (A 13)

WANTED 160-h.p. 750-r.p.m. MOTOR, speed reduction, if possible, 500 r.p.m., voltage 420 d.c.—L. Sterne and Co., Ltd., North Woodside Road, Glasgow. (H 362)

FOR SALE

CABLES & WIRE

ALL types T.R.S. and V.I.R. CABLE in stock. Buy now while obtainable. Send for price lists.—Northern Industries, Snow Hill, Manchester 4. (D 50)

CABLE, T.R.S., 4-core flexible, 14/0076. Brand new, £2 per 100 yds. Large quantities v.i.r. and t.r.s. at bargain prices.—Boyce, Weir and Co., 778 New Hey Road, Huddersfield. (H 327)

ELECTRIC cable shortage. For sale, PLASTIC CABLE, 30 tons, usable. As inspected, all grades with labelled specifications and yardage, on rolls, 1/- lb, or would exchange for scrap copper cable. Brand new MORSE TAPPERS, boxed. Ex-Signal Corps, retailed at 6/6 and 7/6, 27/- dozen. Large size CARBON BRUSHES, 12/- gross. Burglar-proof CYLINDER LATCH LOCKS, Yale type, retails 6/3, our price 30/- doz., plus carriage.—Lewis, 20 Whitechapel High St., London E.1. (H 344)

LARGE stocks P.I.L.C., Armoured and Unarmoured CABLES, suitable for mines and quarries, also light duty flexibles, users only.—Inquiries to Box No. 2059, Electrical Times. (H 305)

TINNED STEEL ARMATURE BINDING WIRE. All sizes from 14 s.w.g. to 30 s.w.g. supplied in coil or on reels.—Frederick Smith and Co., Wire Manufacturers Ltd., Caledonia Works, Halifax. (G 381)

DOMESTIC APPLIANCES

IMMERSION HEATERS. Grubb 4 kW. No purchase tax. All lengths, 16 in. to 36 in. Standard voltages. Provision for intermediate loadings. Fully guaranteed and immediate delivery. Write for illustrated brochure, latest lists and trade terms to distributors.—John Owner and Co., Ltd., Springfield Road, Birmingham 13. Tel.: Spr. 2939. (C 392)

ENGINEERING PLANT & MATERIALS

WELDING PLANT. Several Motor Generator Arc Welders, single, double and multi operator up to 600 amps. Input 400/440 V, 3-phase, 50 c/s. Also several single and double operator transformer arc welders. All modern units by well known makers. Attractive prices. Full details.—Write: Thos. W. Ward, Ltd., Albion Works, Sheffield (Phone 26311, ext. 347). (H 294)

GENERATING PLANT

"ALLEN" GENERATOR for sale, 125 kW, 250 V, d.c., 500 amp, driven by 200 h.p. vertical diesel engine, compressed air starting. With compressor and slate panel, switchboard connections, tank. Inspect at works, W. England.—F. J. Edwards, Ltd., 359 Euston Rd., London N.W.1. (H 352)

FOR Sale, Diesel-driven GENERATING SET, 25 amp, 110 V.—B. G. Plant (Sales Agency), Ltd., Watlington, Oxon (Phone: Watlington 44). (H 300)

GENERATOR FOR SALE, 220 V, d.c., 130 amp, with control panel. Driven by Tangye 34 b.h.p., single-cylinder horizontal diesel engine. Inspection at works in W. England.—F. J. Edwards, Ltd., 359 Euston Rd., London, N.W.1. (H 351)

GENERATING SET

Two Screen Protected Direct Current Horizontal Spindle continuously rated GENERATORS, each 10 kW 110 V, as a compound wound machine, 10 kW 145 V as a shunt machine, speed 1,000 r.p.m. Provided with two end bracket-type grease lubricated ball and/or Roller bearings, terminal box for plain cable and free shaft extension, one 3-panel open flat back type SWITCHBOARD, two automatic starters, driven by two McLAREN RICARDO Diesel oil engines, type L.M.R. 2-cylinder, Nos. 30150 A and B, each complete with flywheel and guard, governor, water circulating pump, fuel filter, radiator with fan, and guard. Lubrication oil cooler mounted on radiator, lubrication oil filter, exhaust manifold silencer, exhaust pipe, air cleaner.

This equipment is new and unused, and was purchased in June, 1946, for the sum of £1,460, and has been carefully stored since its purchase, and can be inspected at Tallington, near Stamford, Lincs. Offers for the equipment should be made to

DOW-MAC (PLANT & TRANSPORT) LTD.
TALLINGTON, STAMFORD, LINCS.
Telephone: Peterborough 4501. (H 256p)

DIESEL ALTERNATOR SETS from stock: 400/440 V, 3-phase, 50 c/s, 167 kVA "Waukesha/G.E.C.," 1,000 r.p.m.; 150 kVA "Petter/Brush," 500 r.p.m.; 135 kVA "Blackstone/Metro-Vick," 500 r.p.m.; 150 kW "General Motors/Westinghouse," 1,000 r.p.m.; 100 kVA "Deutz," 1,000 r.p.m.; 69 kVA "Mclaren/Brush," 1,000 r.p.m.; 65 kVA "Meadows/McFarlane," 1,500 r.p.m.; 62.5 kVA "McLaren/Bruce-Peebles," 1,000 r.p.m.; 50 kVA "National/Bruce-Peebles," 750 r.p.m.; 20 kVA "Lister/Metro-Vick," 1,000 r.p.m. Full details with price post free on request.—Thos. W. Ward, Ltd., Albion Works, Sheffield (Phone 26311, ext. 347). (H 292)

MOTOR GENERATING SETS. Built to customers' requirements of new and used plant. Many in stock at Wembley, inspection invited. Please send us your inquiries. We can help you to save time. Over a THOUSAND MACHINES ALWAYS IN STOCK.—Dynamo and Motor Repairs Ltd., Wembley Park, Middlesex. Telephone: Wembley 3121 (4 lines). Also at Phoenix Works, Belgrave Terrace, Soho Road, Birmingham. Telephone: Northern 0898. (A 2)

LIGHTING EQUIPMENT

Re A. E. Woods, Decd.,
2a Ladbroke Grove, W.11.
SALE BY TENDER
of the Stock in Trade of
ELECTRICAL CONTRACTOR AND RETAILER
Comprising electric fittings, lamps, plugs, sockets, and Appliances. A quantity of steel conduits, wiring, etc. For futher particulars, apply:—
FRANK SWAIN
170 Notting Hill Gate, W.11. Park 4433 (H 346)

PURLEY CHOKES AND BALLASTS. Our 80-w. Tapped h.p.f. Ballast, with Starter Switch-holder incorporated, is proving itself the most popular unit. Suitable for most fittings, 57/6 each, subject.—F. W. Blanshard, Ltd. (Dept. ET), Purley, Surrey. Uplands 4818/9. (E 343)

METERS

A.C. and d.c. Quarterly and Prepayment METERS.—Electric Meter Co., Castor Road, Brixham. (H 332)

A.C. D.C. SLOTMETERS (prepayment meters), all type and sizes. We supply Electricity Boards and Govt Depts. Billiard Switches and Time Switches from stock. If you need reliable instruments write to: Brent Electrical Co., 6 Holmdale Gardens, Hendon, London N.W.4. (A 15)

HOUSE-SERVICE METERS, a.c. or d.c., quarterly or prepayment.—Universal Electrical, 221 City Road, London E.C.1. (C 51)

HOUSE SERVICE METERS, from 5s. Guaranteed two years.—Electric Meter Co., Castor Road, Brixham. (H 333)

METERS a.c. and d.c., new and reconditioned, all types. Quarterly, single and 3-phase, 3 and 4-wire, 2½ to 1,000 amps. Prepayment, single and double tariff, single, dual and triple coin, fixed and variable tariff. 2½ to 50 amps. M.D.I. Billiards Switches, Rent Collectors. Prices from 5/-, carriage paid. Two-year guarantee. Immediate delivery.—Illustrated catalogue from The Electric Meter Company, Castor Road, Brixham. (H 331)

MOTORS & STARTERS

A. ELECTRICAL CO.—FOR A.C./D.C. MOTORS, SWITCHGEAR, EXHAUST FANS, HOISTS, REDUCTION GEARS, new or reconditioned units.—Chiswick 5105, Fairlands 8279, 67 Rothschild Road, W.4. (A 19)

A.C. and D.C. MOTORS, GENERATORS, from stock.—Service Electric Co. Ltd., Honeypot Lane, Stanmore, Middx. Edgware 8631/4. (A 476)

A.C. and D.C. MOTORS, GENERATORS, SWITCHGEAR, etc., always in stock. Let me have your inquiries.—G. E. Whittaker, Wellington Mill, Bolton Road, Blackburn. Tel. 7232. (A 12)

A.C. and D.C. MOTORS, all sizes, large stocks, fully guaranteed.—Milo Engineering Works, Ltd., Milo Road, East Dulwich, S.E.22 (Forest Hill 2278-9). (A 10)

A.C. 75 h.p. E.E. 750 r.p.m. SLIP RING MOTOR, ball and roller bearings; 400/3/50 with Ellison starter; 60 h.p. as above; both motors 3-bearing type; reasonable price.—Boyce, Weir and Co., 778 New Hey Road, Huddersfield. (H 326)

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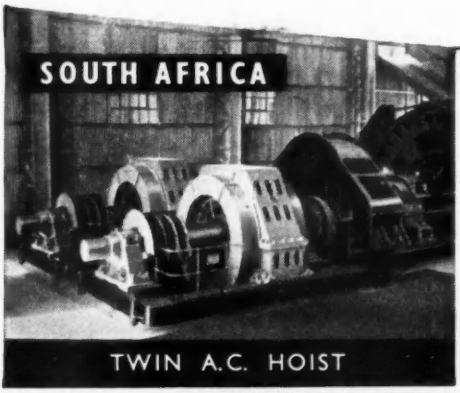

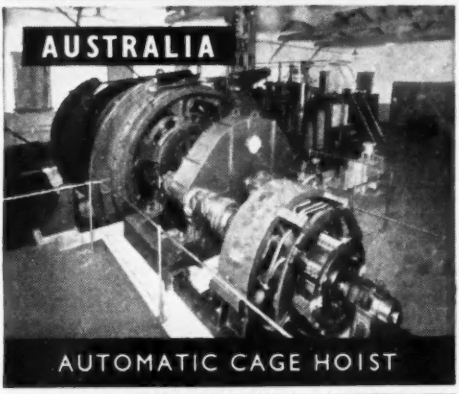

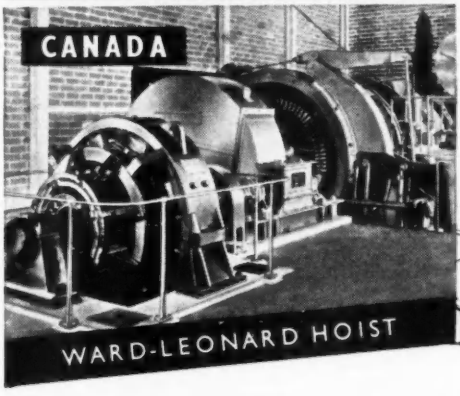

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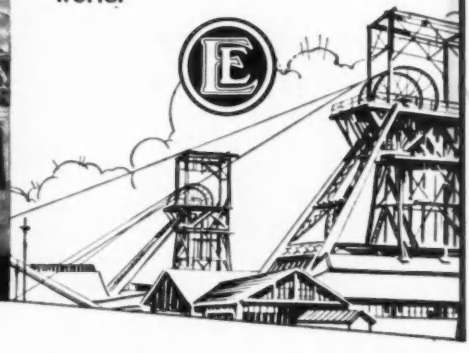

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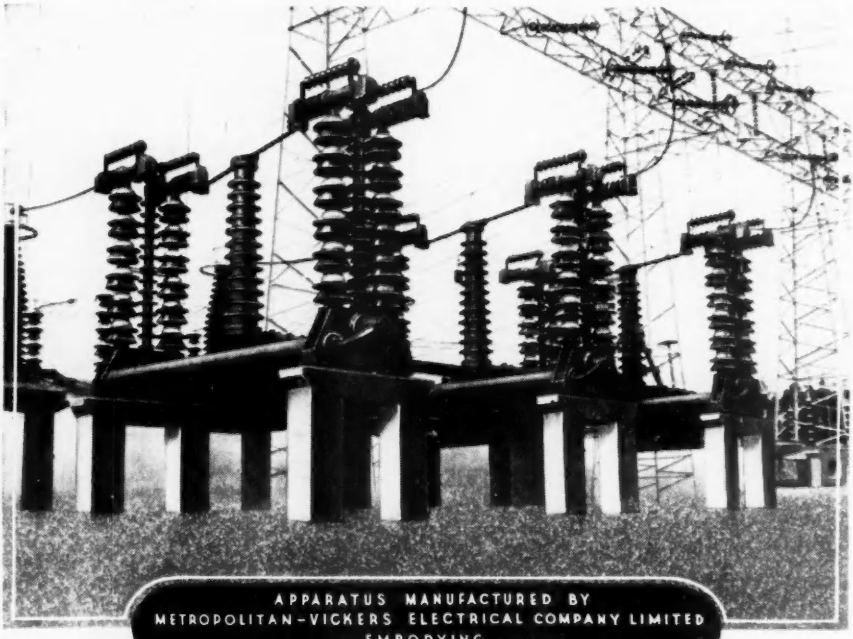

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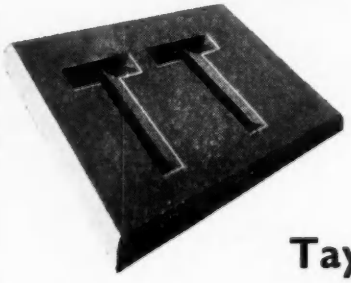

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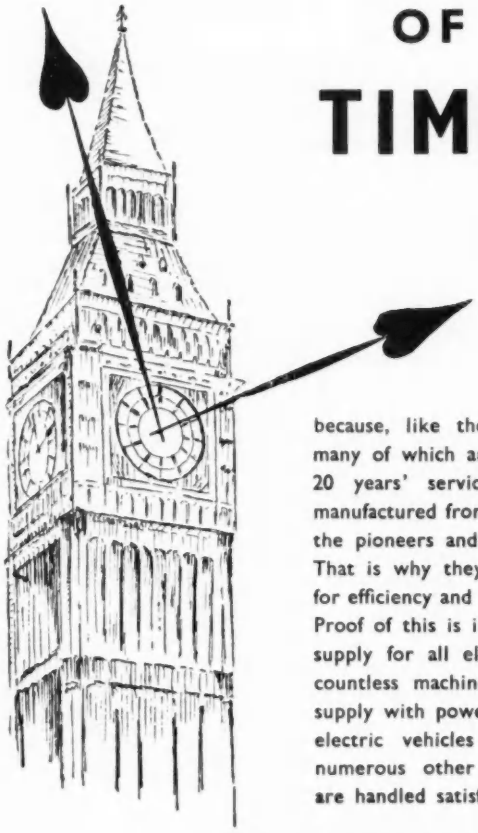

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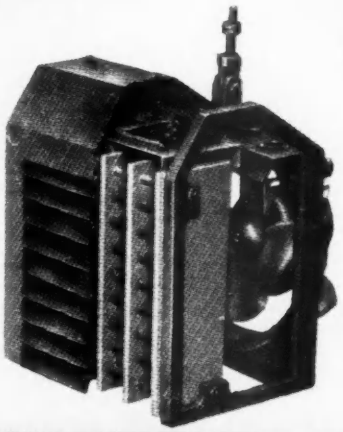

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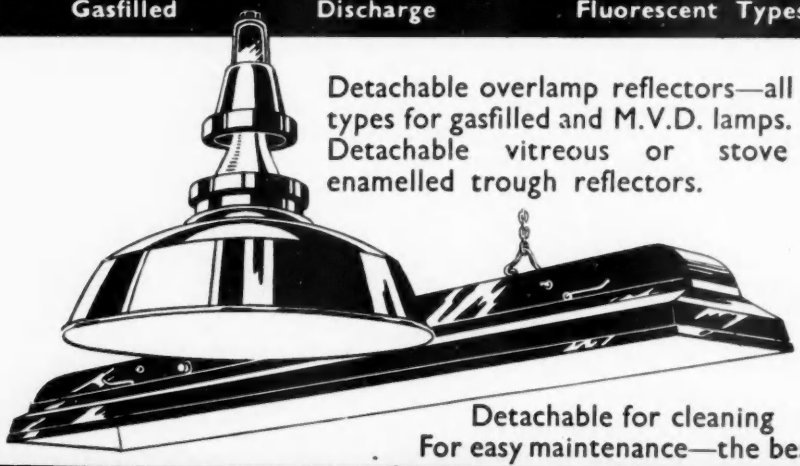

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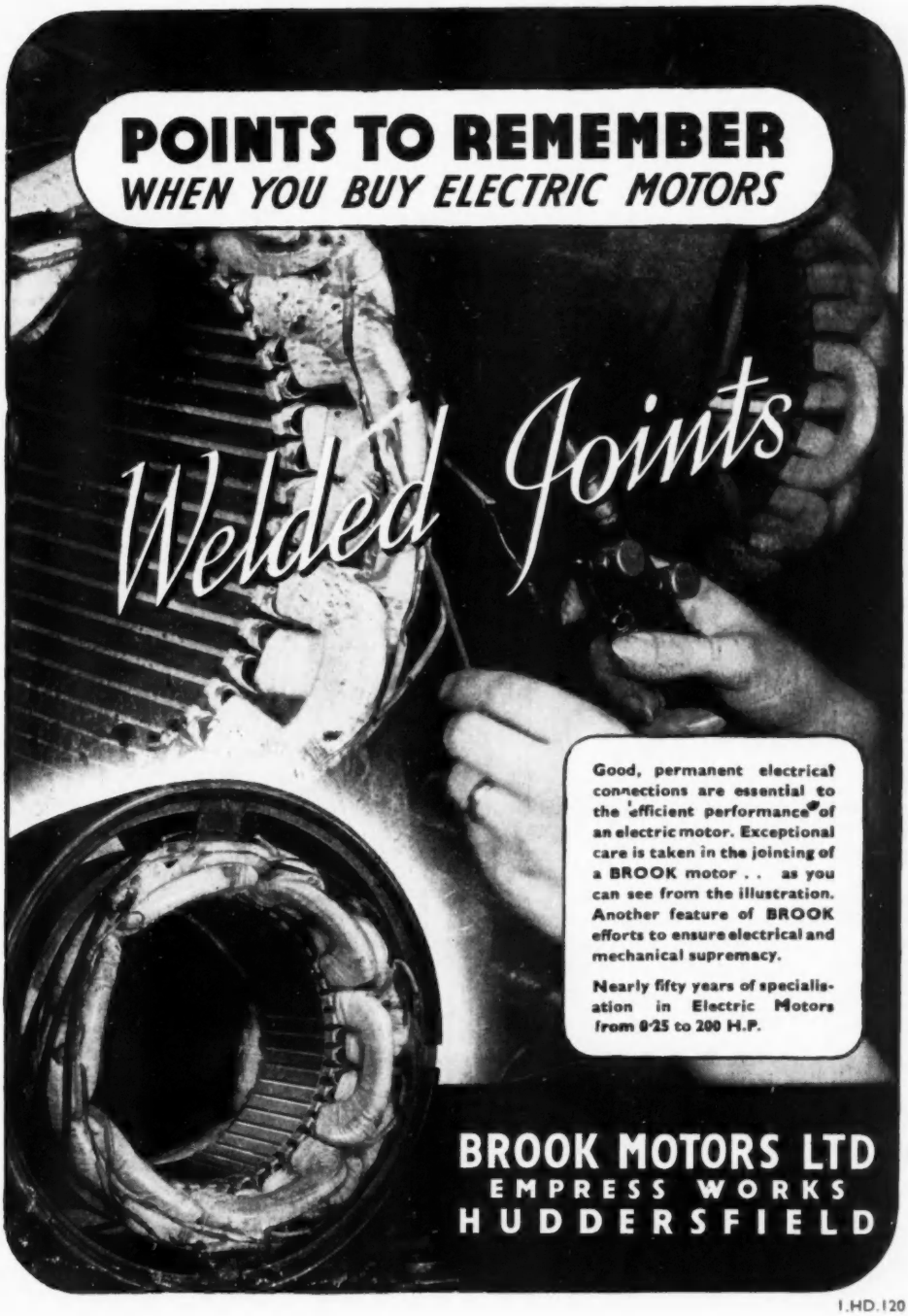

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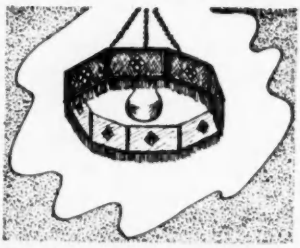

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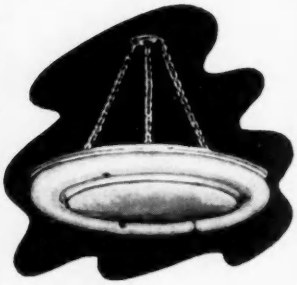

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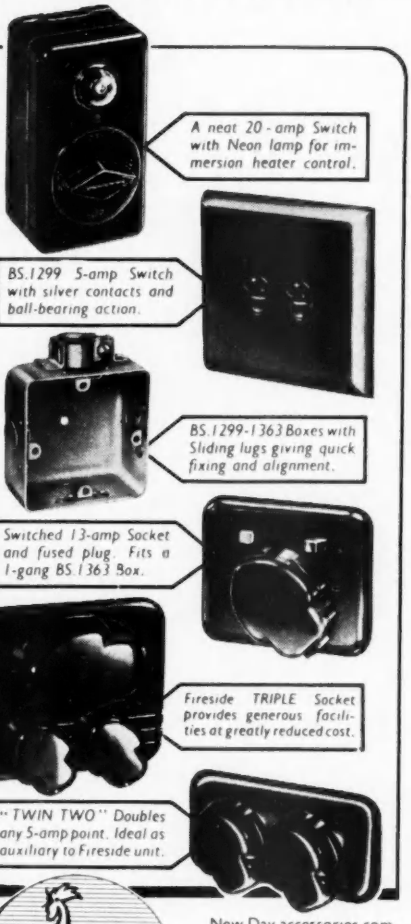
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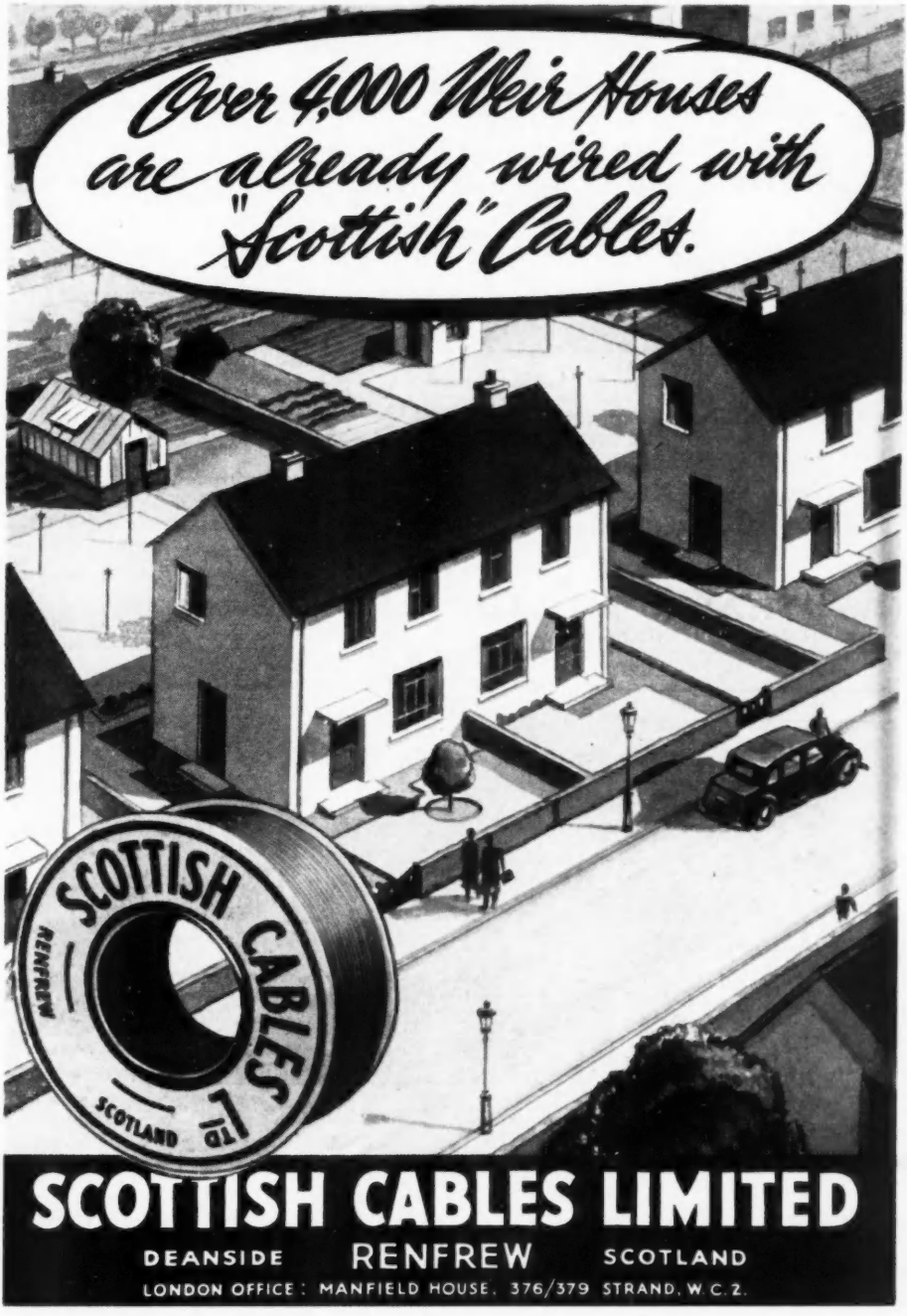
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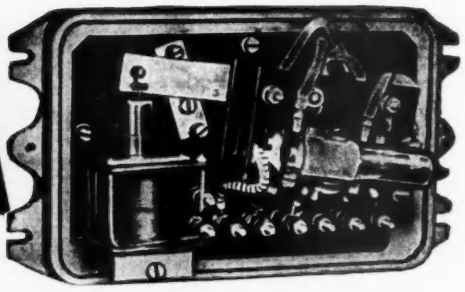

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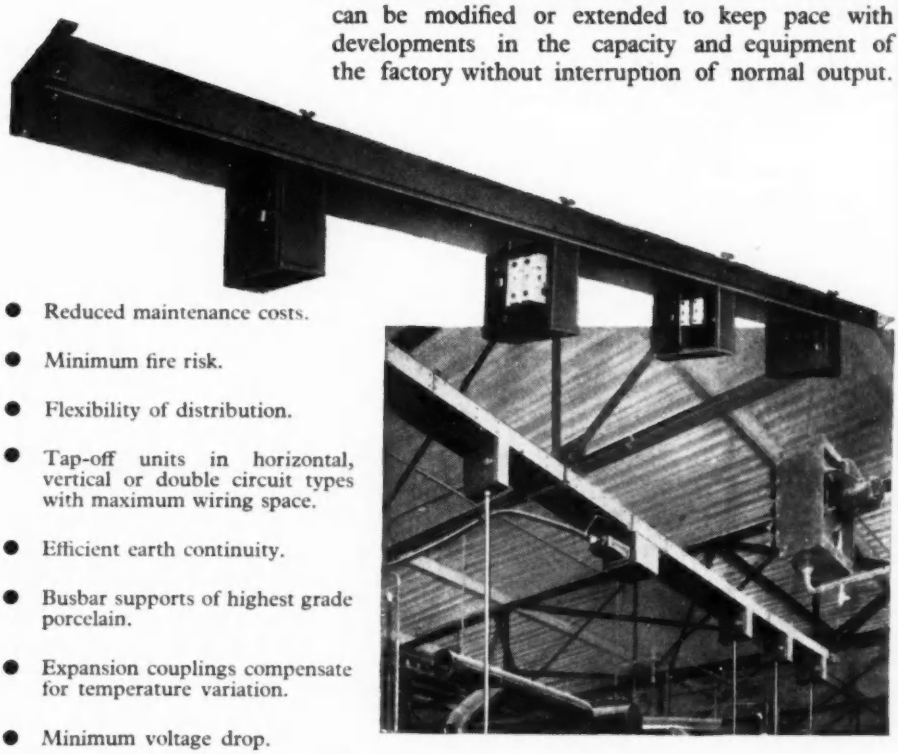

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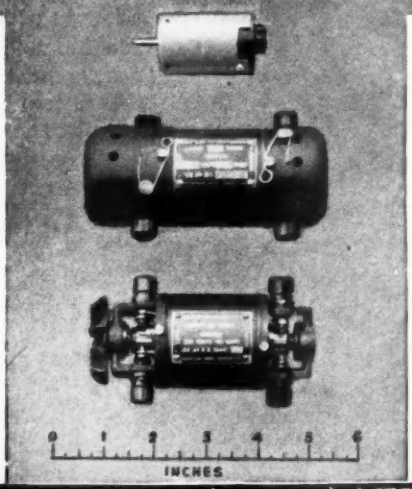

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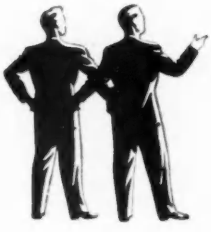

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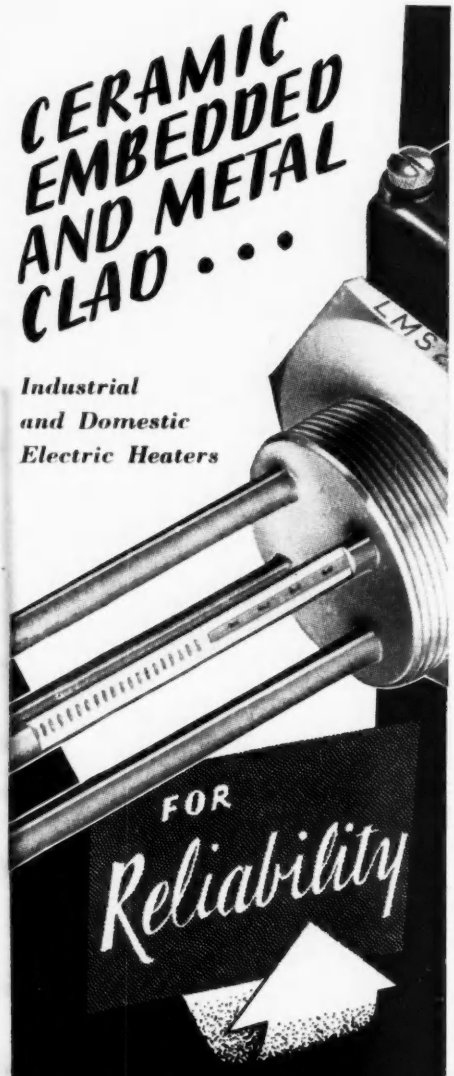

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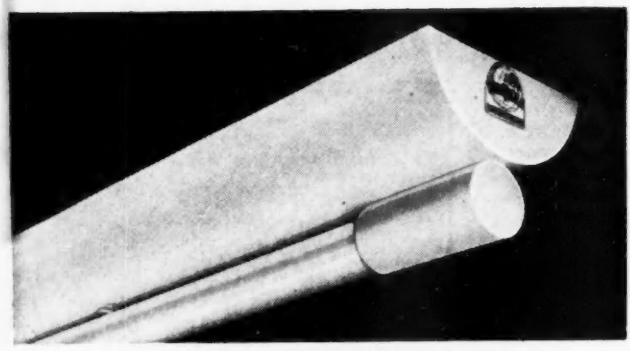

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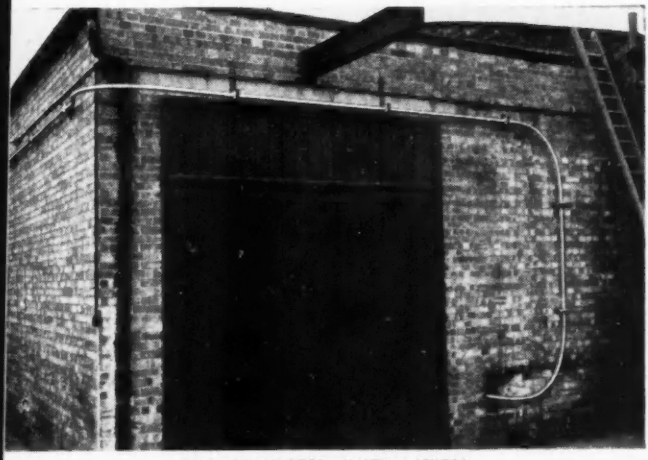

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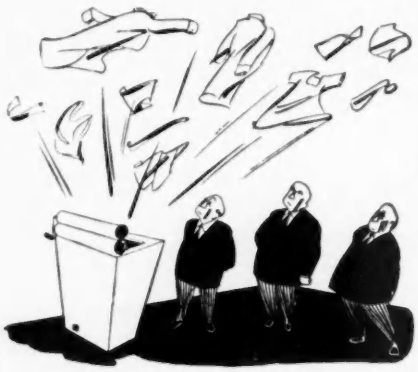

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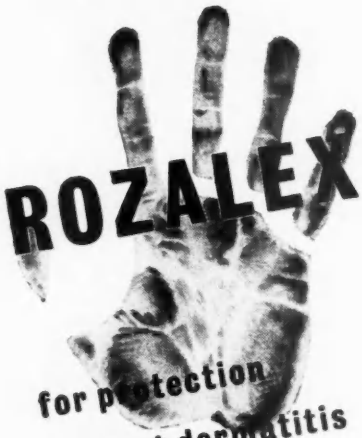

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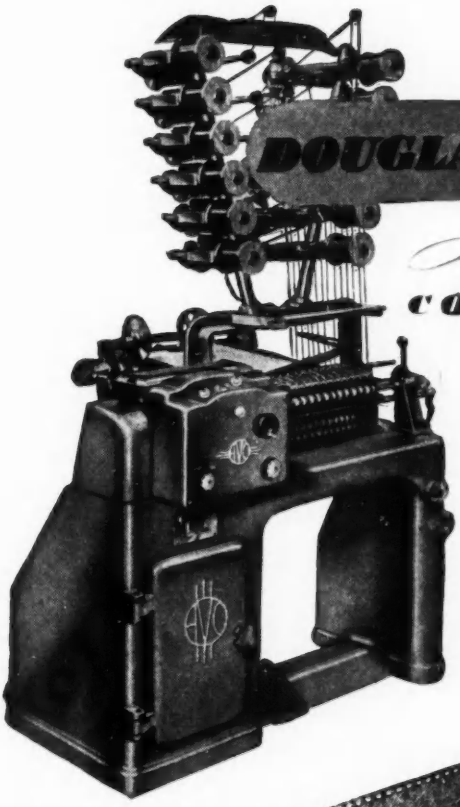

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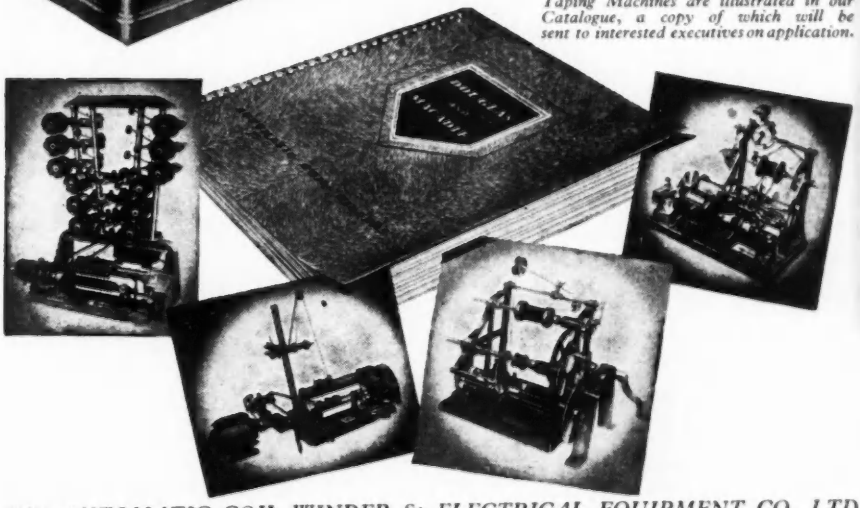

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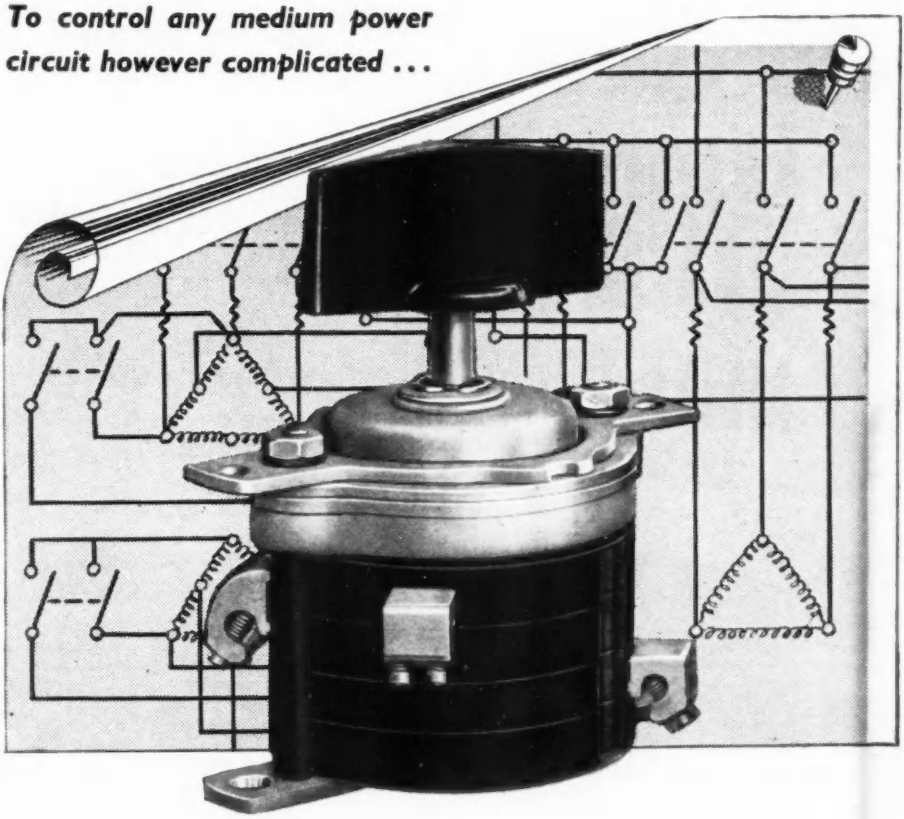

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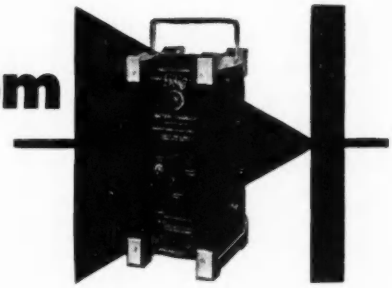

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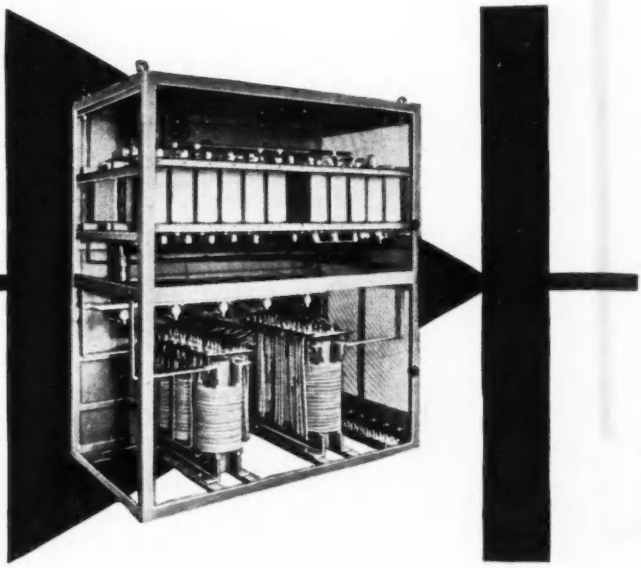

Top illustration: Portable Battery Charger
Lower illustration: Large D.C. Power Supply Unit

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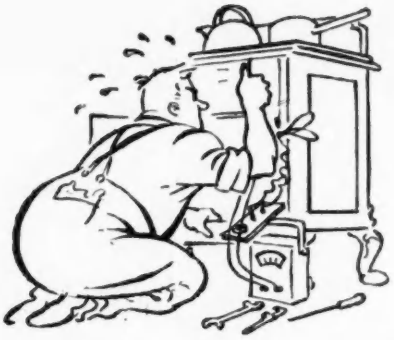

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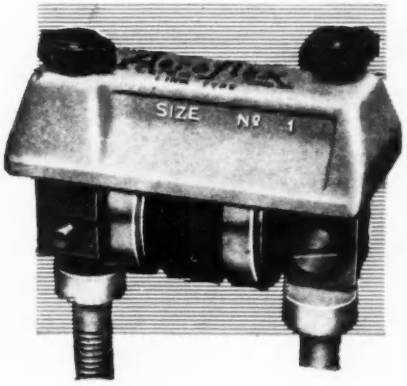

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